

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

NICHIA CORPORATION,

Plaintiff,

v.

EVERLIGHT ELECTRONICS CO., LTD.,
EVERLIGHT AMERICAS, INC., ZENARO
LIGHTING, INC. and ZITROZ LLC,

Defendants.

Case No. 02:13-cv-702-JRG

MEMORANDUM OPINION AND ORDER

FINDINGS OF FACT (“FF”)

I. Introduction

[FF1] This is a civil action asserting patent infringement. (Second Amended Complaint, Dkt. No. 76, at ¶ 6.) Plaintiff Nichia Corporation (“Nichia”) brings claims based on allegations of the Defendants’ unauthorized, infringing manufacture, use, sale, and offer for sale in the United States, and importation into the United States, of light-emitting diode (“LED”) products. (Second Amended Complaint at ¶¶ 14, 18, and 26.) Specifically, Nichia asserts that Defendants infringe the asserted claims of United States Patent No. 7,432,589 (“’589 patent”), No. 7,462,870 (“’870 patent”), and No. 8,530,250 (“’250 patent”) (collectively, “Nichia’s Patents” or the “patents-in-suit”). (*Id.*) Defendants assert counterclaims seeking declarations that the asserted claims of Nichia’s Patents are invalid and not infringed. (Defendants’ Answer and Counterclaim to Plaintiff’s Second Amended Complaint, Dkt. No. 84, at ¶¶15–46.)

[FF2] For the reasons discussed below, Nichia has demonstrated by a preponderance of the evidence that Defendants’ accused products and manufacturing process infringe the

asserted claims of Nichia's Patents. Defendants have not proven by clear and convincing evidence that any of the asserted claims of Nichia's Patents are invalid.

[FF3] In its Second Amended Complaint Nichia withdrew its claim for monetary damages and instead, requested prospective relief in the form of a permanent injunction. *Compare* (First Amended Complaint, Dkt. No. 13, at ¶ C & D) *with* (Second Amended Complaint at ¶ C.) For the reasons discussed below, Nichia has not demonstrated that Defendants' past and continuing infringement of Nichia's Patents has caused, and will continue to cause, irreparable harm to Nichia. In these circumstances, and taking into account all relevant factors, Nichia has not demonstrated that it is entitled to injunctive relief.

[FF4] This matter was tried to the Court, without a jury, on May 11, 12, and 13, 2015.

A. The Parties

i. Plaintiff Nichia Corporation

[FF5] Nichia is a corporation organized and existing under the laws of Japan, with its principal place of business at 491 Oka, Kaminaka-Cho, Anan-Shi, Tokushima, Japan 774-8601. (Second Amended Complaint at ¶ 1.)

[FF6] Nichia earns revenue from the sales (including sales in the United States) of a wide array of products including LEDs, laser diodes ("LDs"), fine chemicals, and luminescent materials. (PTX719 (Nichia America Corp. Financial Statements) at 7, ¶ 1(a).) Nichia's LEDs are inputs to a variety of products, including general lighting, displays, automobiles, and backlighting. (5/12/2015 AM Trial Tr., Dkt. No. 167, at 10:8-22.)

[FF7] Nichia operates in the United States through its subsidiary Nichia America Corp. ("Nichia America"). Nichia America is Nichia's sole distributor in the U.S. (PTX561 (Nichia America – Nichia Corporation Distributor Agreement, "Distributorship/Agency

Agreement,” 11/16/01); PTX1220 (Nichia-Nichia America Purchase Agreement dated as of October 1, 2013).)

ii. Defendant Everlight Electronics Co., Ltd.

[FF8] Defendant Everlight Electronics Co., Ltd. (“Everlight”) is a corporation organized and existing under the laws of Taiwan, with its headquarters and principal place of business at No. 6-8, Zhonghua Rd., Shulin Dist., New Taipei City, Taiwan 23860. (Second Amended Complaint, ¶ 2; Defendants’ Answer, ¶ 2.) Everlight is an LED packaging company that buys chips from suppliers and packages them into LEDs. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 27:25-28:15.) Everlight sells products to customers located in the U.S. directly and through its subsidiaries, Defendants Everlight Americas and Zenaro. (PTX406 (Everlight Annual Report for 2013), PTX408 (partial translation of PTX406).)

iii. Defendant Everlight Americas, Inc.

[FF9] Defendant Everlight Americas, Inc. (“Everlight Americas”) is a subsidiary of Everlight. Everlight Americas is incorporated in Texas, and has its principal place of business at 3220 Commander Dr., Suite 100, Carrollton, Texas, 75006. (Second Amended Complaint, ¶ 3; Defendants’ Ans., ¶ 3; 5/12/2015 PM Trial Tr., Dkt. No. 168, at 21:15-2.) Everlight Americas offers for sale and sells in North America Everlight’s accused products. Everlight Americas makes sales directly to Everlight’s customers, and it also makes “commission sales,” whereby it initiates sales in the United States with a customer, but the sale itself takes place outside of the United States by and through another Everlight entity. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 56:4-57:16.)

iv. Defendant Zenaro Lighting, Inc.

[FF10] Defendant Zenaro Lighting, Inc. (“Zenaro”) is a Florida corporation with its principal place of business at 3618 Quantum Blvd., Boynton Beach, Florida 33426. Zenaro is a subsidiary of Defendant Everlight. (Second Amended Complaint, ¶ 4; Defendants’ Ans., ¶ 4; PTX406, 408 (Everlight 2013 Annual Report and translation).)








[FF11] By stipulation, the parties agreed not to “raise issues or present evidence at trial with respect to the activities, status, or liability of Zenaro Lighting, Inc.” The parties further agreed that any injunction issued in this lawsuit, in addition to including the language specified in Fed. R. Civ. P. 65(d)(2), “will apply (a) to any product that incorporates an LED to which the injunction applies, and (b) to any product that incorporates an LED that is not colorably different from an LED to which the injunction applies.” *See* (Parties’ Second Additional Stipulations Re: Trial (Dkt. No. 149), ¶ 2.)

v. Defendant Zitroz LLC

[FF12] Defendant Zitroz LLC (“Zitroz”) is a California limited liability company with its principal place of business at 3855 Main Street, Chula Vista, California 91911. (Second Amended Complaint, ¶ 5; Defendants’ Ans., ¶ 5.) Zitroz has been a manufacturer’s representative for Zenaro, and has provided direct sales and marketing support for Zenaro’s LED lamp and luminaire retrofit program, as well as for Zenaro’s retail distribution initiatives in the United States and Canada.

[FF13] On May 7, 2015, the Court granted an agreed, joint motion, which dismissed all of Nichia’s claims against Zitroz without prejudice. The Court likewise dismissed all of Zitroz’s counterclaims and defenses against Nichia without prejudice. The Court’s order had no effect on the claims, counterclaims, or defenses between the other parties. (Dkt. No. 156.)

[FF14] The following chart identifies, for each of the asserted claims of the Nichia Patents, the accused Everlight products:

Asserted Claims, Accused Products							
	 XI3030 XI3535	 62-217D 62-257D	 45-21S	 61-238	 67-11 67-21	 62-217B 62-227B	 EHP-A09K
'250							
1	✓						
7	✓						
17	✓	✓	✓				
19		✓	✓				
21	✓	✓	✓				
'589							
1				✓			
2					✓		
'870							
2				✓	✓	✓	
3				✓	✓	✓	
9					67- only		✓
10				"meat" only	"meat" only	✓	
11				"meat" only	"meat" only	✓	

NDX 140

B. The Parties' Witnesses

[FF15] At trial, the Court heard testimony from the following expert witnesses called by Nichia:

- Dr. E. Fred Schubert is a Distinguished Professor in the Department of Electrical, Computer, and Systems Engineering at Rensselaer Polytechnic Institute in New York. He has worked in the field of semiconductor microelectronic and optoelectronic devices, including LEDs, for over 30 years. Dr. Schubert previously was a professor at Boston University. He also spent ten years working in the lighting industry at AT&T Bell Labs. Dr. Schubert is the author of academic textbooks and other publications in the field of LEDs. He is the

founding director of the Smart Lighting Engineering Research Center, which is funded by the National Science Foundation. The Center's work concerns LEDs and the packaging of LED devices to make intelligent or "smart" lighting systems. A full explanation of Professor Schubert's qualifications is set forth in the Stipulation Regarding the Qualification of Plaintiffs' and Defendants' Experts. (Dkt. No. 154 ("Expert Stip."), ¶¶ 1-13.) The Court finds that Dr. Schubert is a qualified expert witness in the field of light-emitting diode and semiconductor technology, including packaging. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 29:24-30:8.)

- b. Dr. Matthew Lynde is an economist and a Vice President of Cornerstone Research, an economic and financial consulting firm. Dr. Lynde earned B.A. and Ph.D. degrees in economics from the University of California at Berkeley. Dr. Lynde's dissertation research concerned the impact of technological innovation on international competition. As an undergraduate, Dr. Lynde studied electrical engineering as well as economics. Dr. Lynde has held positions with the President's Council on Wage and Price Stability, as well as the Brookings Institution. As a consultant, Dr. Lynde specializes in the applied economic, financial, and statistical analysis of complex business and regulatory matters. Dr. Lynde has provided expert witness support in over 100 matters, and he has been involved in over 300 patent matters. A full explanation of Dr. Lynde's qualifications is set forth in the Expert Stip. (Expert Stip., ¶¶ 14-22.) The Court finds that Dr. Lynde is a qualified expert witness in the field of

economics as it relates to patent damages and remedies. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 53:24-54:54:14.)

[FF16] At trial, the Court heard testimony from the following expert witnesses called by Defendants:

- a. Dr. Eric Bretschneider is currently employed by EB Designs and Technology, a consulting company in the LED industry. Dr. Bretschneider received a BSE in chemical engineering from Tulane University in 1989, and he received his Ph.D. in chemical engineering from the University of Florida in 1997. Following completion of his doctoral work, Dr. Bretschneider was employed by companies within the LED industry in various capacities, including as director of IP for a publically-traded LED company. He is the inventor or named author on over 25 patents and publications, including LED patents relating to national security matters. A full explanation of Dr. Bretschneider's qualifications is set forth in the Expert Stip. (Expert Stip., ¶¶ 23-30.) The Court finds that Dr. Bretschneider is a qualified expert in the field of LED and semiconductor technology, including packages. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 119:23-120:5.)
- b. Dr. Russell W. Mangum, III is a professor in the School of Business and Economics at Concordia University in Irvine, California. He is also a Senior Vice President at Nathan Associates, Inc. Dr. Mangum received his B.A. in economics from California State University, Fullerton and his M.A. and Ph.D. in economics from the University of Southern California. Dr. Mangum has experience in the analysis of matters relating to commercial damages, including damages relating to intellectual property matters, and he has provided opinions in cases involving lost

sales damages, reasonable royalties, and damages for unjust enrichment. A full explanation of Dr. Mangum's qualifications is set forth in the Expert Stip.

(Expert Stip., ¶¶ 31-39.) The Court finds that Dr. Mangum is a qualified expert witness in the field of economic damages and remedies. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 8:7-16.)

[FF17] At trial, the Court heard testimony from the following fact witnesses called by Nichia:

- a. Mr. Eric Swenson, Nichia America Corporation;
- b. Mr. Todd Lynema, Nichia America Corporation;
- c. Mr. Hiroto Tamaki, Nichia Corporation;
- d. Mr. Tomohide Miki, Nichia Corporation;
- e. Mr. Kenji Matsumoto, Nichia Corporation;
- f. Everlight Corporation (through its corporate designees pursuant to Fed. R. Civ. P. 30(b)(6); and
- g. Everlight Americas, Inc. (through its corporate designee pursuant to Fed. R. Civ. P. 30(b)(6).

[FF18] At trial, the Court heard testimony from the following fact witnesses called by defendants:

- a. Mr. Bernd Kammerer, Everlight Americas, Inc.;
- b. Mr. Ewing Liu, Everlight Electronics Co., Ltd.;
- c. Mr. Allen Hsieh, Everlight Electronics Co., Ltd.;
- d. Mr. Hirofumi Ichikawa, Nichia Corporation; and

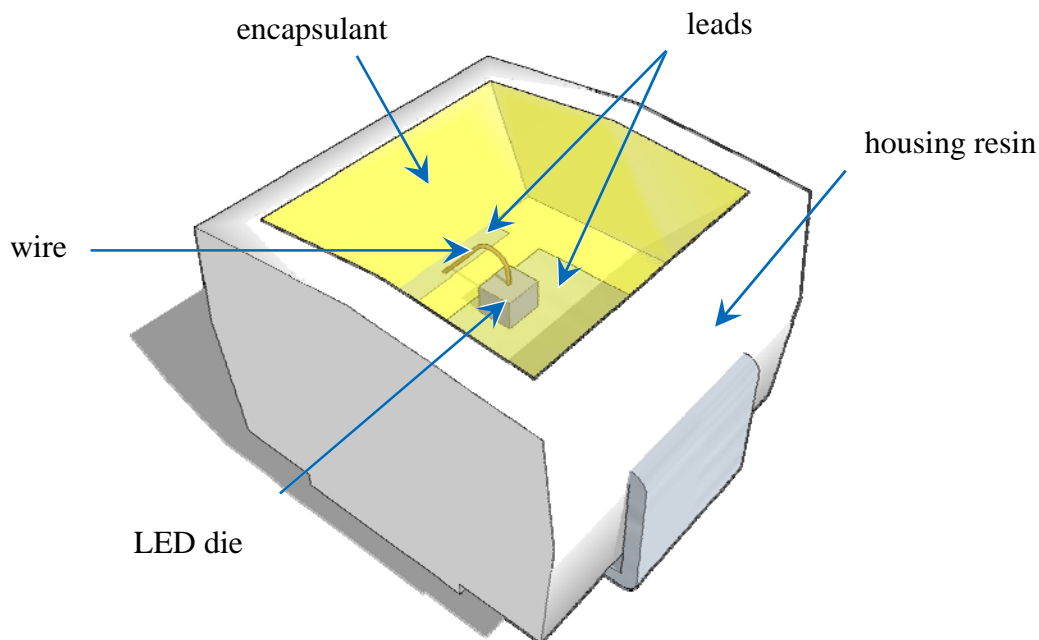
- e. Nichia Corporation (through its corporate designees pursuant to Fed. R. Civ. P. 30(b)(6).

C. Technology Overview

[FF19] LEDs are used in a wide variety of applications, including: (i) LCD backlighting applications, such as cell phones, laptop computers, and televisions; (ii) video display applications, such as billboards and scoreboards; (iii) automotive applications, such as interior and exterior lighting of a vehicle; and (iv) general lighting applications, such as lightbulbs. (5/12/2015 AM Trial Tr., Dkt. No. 167, at 10:8-19.) LEDs are typically small in scale with heights measuring 1 millimeter or less. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 31:2-17.)

i. LED Package: Components

[FF20] A common configuration for an LED package is depicted below:



[FF21] The LED “package” includes the following individual parts: (i) the “leads,” which are used to conduct the electrical current to the LED chip; (ii) the “resin housing,” which is made out of a reflective resin and includes a recess in which the LED chip is placed; (iii) the “LED chip” or “LED die” (about the size of a grain of salt), which is mounted in the recess typically by using an adhesive material in a process known as die bonding; (iv) one or more “bond wires” that connect the LED chip to the leads; and (v) an “encapsulation material” that encapsulates the LED chip and protects it from the environment. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 31:23-32:22.)

ii. LED Packaging: Integrating Multiple Design Challenges

[FF22] LED package design involves the simultaneous integration and balancing of multiple design considerations, including electrical, optical, thermal, and mechanical design challenges. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 33:16-34:23.) Multiple challenges must be addressed when designing an LED package: (i) electrical design challenges: “We have to conduct a relatively high-current density through the small LED chip and connect the LED chip to the leads;” (ii) optical design challenges: “The intensities are very high, because the LED chip is very small and the power emitted by the LED is quite high. And, therefore, we need to handle a very high-optical radiation density;” (iii) thermal design challenges: “The LED chip inevitably creates heat, and this heat needs to be conducted away;” and (iv) mechanical design challenges: “includes protecting the LED chip from any external effect, such as moisture or mechanical intrusion.” (5/11/2015 AM Trial Tr., Dkt. No. 165, at 33:16-34:17.) These multiple requirements can be “contradictory” and can “pull the design in different directions.” *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 34:18-23); *see also* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 107:8-108:2.)

II. Person of Ordinary Skill in the Art

[FF23] The field relevant to the inventions of the patents-in-suit is light emitting diode and semiconductor technology, including packaging. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 86.)

[FF24] A person of ordinary skill in the art as of the respective June 2003 to September 2008 priority dates of the Asserted Patents would have had: (1) a Ph.D. degree in Applied Physics, Chemical Engineering, Electrical Engineering, Material Science, or a related field, and approximately 3 years of practical experience in the field of light emitting diode and semiconductor technology, including packaging; (2) a Master's degree in Applied Physics, Chemical Engineering, Electrical Engineering, Material Science, or a related field, and approximately 5 years of practical experience in the field of light emitting diode and semiconductor technology, including packaging; or (3) a Bachelor's degree in Applied Physics, Chemical Engineering, Electrical Engineering, Material Science, or a related field, and approximately 10 years of practical experience in the field of light emitting diode and semiconductor technology, including packaging. These descriptions are approximate, and a higher level of education might make up for less experience, and vice versa. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 86.)

III. Representative Products

[FF25] On May 10, 2015, the parties stipulated to "representative products." *See* (Stipulation Regarding Representative Products (Dkt. No. 158).) The parties agreed that each of these representative products is "representative of the other accused Everlight products in the same product series" set forth in Exhibits 2-10 of the Stipulation. (*Id.*) The representative products are as follows:

Accused Product Series	Accused/Representative Products	Samples (PPX)	IAL/TAEUS Reports (PTX)
XI3030	XI3030/KK3C-H2727R8S4S2Z15/2T	128, 167, 267	458, 543, 545, 553, 556
XI3535	XI3535-KT577J1-03201-000P	126, 169, 269	460, 544, 546, 554, 555
62-217D	62-217D/KK3C-H5050R2R5B4Z215/2T	123, 172, 272	463, 548
62-257D	62-257D/KK2D-H5050R1R4A4A7Z3/2T	125, 170, 270	461, 547
45-21S	45-21 S/KK2C-S3535L7M3B2Z6/2T	148, 256, 331	538, 549
61-238	61-238/LK2C-B28322FAGB2/ET	82, 213, 296	503, 542
67-11	67-11/BHC-FQ2S1F/2T	84, 211, 294	501, 541
67-21	67-21/B7C-AS2U1N/2T	87, 208, 292	498, 540
62-217B	62-217B/KK2C-S3030QAR2B4Z215/2T	131, 160, 260	451
62-227B	62-227B/KK2C-N3030N4P3S2Z6/2T	74, 234, 316	522
EHP-A09K	EHP-A09K-BRTT-5670HDBEBD9K-1T8-AM	57, 81, 217, 299	506

(*Id.* at Exhibit 1.)

IV. Evidence of Infringement

[FF26] The evidence establishing that the representative products, and Defendants’ importation, offer for sale, and/or sale of such products, literally infringes the asserted claims of Nichia’s Patents includes:

- (1) samples of the products in the accused product series produced by Everlight;
- (2) the Technical Analysis Reports compiled by laboratory personnel at IAL and TAEUS (“IAL/TAEUS Reports”) for the representative products;
- (3) the documents produced by Everlight relating to the accused product series; and
- (4) Everlight admissions, including the 30(b)(6) deposition testimony of Everlight relating to the accused product series and the Stipulated Facts.

(5/11/2015 AM Trial Tr., Dkt. No. 165, at 40:25-42:23.)

[FF27] Dr. Schubert reviewed an IAL/TAEUS Report for each representative product. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 42:12-15.) The IAL/TAEUS Reports include optical and x-ray images of the products showing the exterior, interior, and cross-sections of the products. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 44:20-46:9); *see, e.g.*, (PTX458 (IAL/TAEUS Report for the representative XI3030 product).)

V. U.S. Patent No. 8,530,250

A. Summary of the '250 patent

[FF28] The '250 patent is entitled "Light Emitting Device, Resin Package, Resin-Molded Body, and Methods for Manufacturing Light Emitting Device, Resin Package and Resin-Molded Body" and issued September 10, 2013. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 1.)

[FF29] The '250 patent names Hirofumi Ichikawa, Masaki Hayashi, Shimpei Sasaoka, and Tomohide Miki as the named inventors. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 2.)

[FF30] The earliest priority date for the asserted claims of the '250 patent is September 3, 2008. *See* ('250 patent, PTX004.)

[FF31] The '250 patent is assigned to Nichia Corporation. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 3.)

[FF32] The '250 patent is discloses a "simple and low-cost method for manufacturing, in a short time, multiple light emitting devices which has [sic] high adhesion between a lead frame and a thermosetting resin composition." *See* ('250 patent, col. 2 ll. 49-53.)

[FF33] The '250 patent provides an overview of the claimed inventions as follows:

Provided is a simple and low-cost method for manufacturing, in a short time, many light emitting devices wherein adhesiveness between a leadframe and a

thermosetting resin composition is high. The method . . . [includes:] a step of sandwiching a leadframe (21) provided with a notched section (21a) by an upper molding die (61) and a lower molding die (62); a step of transfer-molding a thermosetting resin (23) containing a light-reflecting substance (26), in a molding die (60) sandwiched by the upper molding die (61) and the lower molding die (62) and forming a resin-molded body (24) on the leadframe (21); and a step of cutting the resin-molded body (24) and the leadframe (21) along the notched section (21 a).

(’250 patent, Abstract.)

[FF34] The features of the disclosed LED device include, for example, “a resin part and a lead [that] are formed substantially in the same plane in an outer side surface, and . . . at least one surface of a bottom surface and an upper surface of a lead is plated and the outer side surface of the lead is not plated.” (’250 patent, col. 3 ll. 60-65.) “[O]ne of the key features of the patent is that the outer surface of the resin part and the lead are planar.” (5/11/2015 AM Trial Tr., at 35:17-24.)

B. Asserted Claims of the ’250 patent

[FF35] Claims 1, 7, 17, 19, and 21 of the ’250 patent are asserted in this case and are reproduced below:

Claim 1	Claim Language
Preamble	A method of manufacturing a light emitting device, the method comprising:
[a]	providing a lead frame comprising at least one notch;
[b]	plating the lead frame;
[c]	after plating the lead frame, providing an upper mold on a first surface of the plated lead frame and a lower mold on a second surface of the plated lead frame, and transfer-molding a thermosetting resin containing a light reflecting material in a space between the upper mold and the lower mold to form a resin-molded body; and
[d]	cutting the resin-molded body and the plated lead frame along the at least one notch to form a resin package, the resin package comprising a resin part and at least one lead, and the cutting step being performed such that an outer surface of the resin part

	and an outer surface of the at least one lead are planar at an outer side surface of the resin package,
[e]	wherein the plated lead frame is cut so as to form an unplated outer side surface on the lead.

Claim 7	Claim Language
[a]	The method according to claim 1, further comprising: providing a light emitting element in a concave portion of the resin package,
[b]	wherein the transfer-molding step forms a plurality of concave portions corresponding to the convex portions of the upper mold, each of the concave portions comprising an inner bottom surface at which a portion of the lead frame is exposed.

Claim 17	Claim Language
Preamble	A light emitting device comprising:
[a]	a resin package comprising a resin part and at least one lead,
[b]	wherein an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer surface of the resin package,
[c]	wherein a plating is disposed on an upper surface and a lower surface of the at least one lead,
[d]	wherein an outer side surface of the at least one lead is unplated, and
[e]	wherein a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead.

Claim 19	Claim Language
[a]	The light emitting device according to claim 17, wherein the at least one lead comprises a step on a bottom surface or outer surface thereof.

Claim 21	Claim Language
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Claim 21	Claim Language
[a]	The light emitting device according to claim 17, wherein the at least one lead comprises two or more different levels.

C. Products Accused of Infringing the '250 patent

[FF36] The products accused of infringing the '250 patent (the "'250 Accused Products") include: (1) the XI3030 series products; (2) the XI3535 series products; (3) the 62-217D series products; (4) the 62-257D series products; (5) the 45-21S series products; and (6) lamps, luminaires, fixtures and other products incorporating those products. The results of the infringement analysis for each representative product discussed below extend to the other '250 Accused Products within the same product series. (Stipulations re Representative Products ("Rep. Prods. Stips."), Ex. 1 to Dkt. No. 158, at 1.)

[FF37] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States, the '250 Accused Products. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), Nos. 5-9 (regarding sale of the XI3030, XI3535, and 45-21S series products); DTX415 (Revenue from Accused Everlight LED Products Sold in or Shipped to U.S.).)

D. Construction of '250 patent Claim Terms

i. The Preambles of Claims 1 and 17 are Claim Limitations

[FF38] In its Claim Construction Memorandum Opinion and Order (Dkt. No. 79), this Court determined that the preambles of claims 1 and 17 are claim limitations. (Claim Construction Order, Dkt. No. 79, at 53-54.) "[T]he entirety of the '250 patent reveals that the preamble language relating to 'light emitting device' does not state a purpose or an intended use of the invention, but rather discloses a fundamental characteristic of the claimed invention that is properly construed as a limitation of the claim itself." (Claim Construction Order, at 54 ("[T]he

preamble language gives life, meaning and vitality to the claims by making it clear that claim 17 is directed to a light emitting device and claim 1 is directed to a method for manufacturing a light emitting device.”.)

ii. “Lead”

[FF39] Claims 1, 17, 19, and 21 of the ’250 patent include the term “lead.” This Court construed “lead” as “the portion of the device that conducts electricity.” (Claim Construction Order, at 57.) Although a lead must conduct electricity, “this does not foreclose the recited ‘lead’ from performing other functions in addition to conducting electricity.” (*Id.*)

iii. “A Portion of the Resin Part is Disposed Over a Portion of the Plating on the Upper Surface of the at Least One Lead”

[FF40] Claim 17 of the ’250 patent requires that “a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead,” which was construed to mean “a portion of the resin part is located over a portion of the plating on the upper surface of the at least one lead.” (Claim Construction Order, at 64.) This Court rejected Defendants’ contention that claim 17 “allows for all of the resin part to be disposed over all of the plating on the upper surface of the at least one lead.” (*Id.* at 63-64 (“A portion is not ‘all’ as Defendants contend.”).)

iv. “Notch”

[FF41] Claim 1 of the ’250 patent requires providing a lead frame having at least one “notch.” This Court construed the term “notch” to mean “an opening that penetrates the lead frame.” (Claim Construction Order, at 66-67.)

- v. “Cutting the Resin-Molded Body and the Plated Lead Frame Along the at Least One Notch”

[FF42] Claim 1 recites the step of “cutting the resin-molded body and the plated lead frame along the at least one notch,” which this Court determined should be given its plain and ordinary meaning. (Claim Construction Order, at 67-69.)

- vi. “Planar”

[FF43] Claims 1 and 17 require that an outer surface of at least one lead and an outer surface of the resin part are “planar.” This Court construed “planar” to mean “in a substantially same plane.” (Claim Construction Order, at 69-72.) The construction of “planar” does not require that the “leads and outer surface of the resin package to be perfectly flat.” (Claim Construction Order, at 71.)

E. Alleged Infringement of the Asserted Claims of the '250 patent

- i. The XI3030 and XI3535 Series Products Contain Every Element of Claims 1 and 7 of the '250 patent

[FF44] The manufacturing process used to produce both the XI3030 and XI3535 series accused products is the same. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 12.) As such, these products are addressed together.

Claim 1

[FF45] The Court finds that all of the claim limitations of Claim 1 of the '250 patent exist in and are met by the accused XI3030 and XI3535 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A method of manufacturing a light emitting device, the method comprising

[FF46] The parties agree that the process used to make the accused XI3030 and XI3535 series products is a method of manufacturing a light emitting device. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), Nos. 11 and 12.)

1[a] providing a lead frame comprising at least one notch

[FF47] The process used to make the accused XI3030 and XI3535 series products includes the step of providing a lead frame comprising at least one notch (claim element 1[a]).

[FF48] Defendants receive plated lead frames provided by their third party lead frame suppliers for the accused XI3030 and XI3535 series products. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 13.)

[FF49] The lead frames of the accused XI3030 and XI3535 series products that Defendants receive from their third party lead frame suppliers have notches. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 14.)

1[b] plating the lead frame

[FF50] The process used to make the accused XI3030 and XI3535 series products includes the step of plating the lead frame (claim element 1[b]).

[FF51] Defendants receive plated lead frames provided by their third party lead frame suppliers for the accused XI3030 and XI3535 series products. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 13.)

1[c] after plating the lead frame, providing an upper mold on a first surface of the plated lead frame and a lower mold on a second surface of the plated lead frame, and transfer-molding a thermosetting resin containing a light reflecting material in a space between the upper mold and the lower mold to form a resin-molded body

[FF52] The process used to make the accused XI3030 and XI3535 series products includes the step of, after plating the lead frame, providing an upper mold on a first surface of the plated lead frame and lower mold on a second surface of the plated lead frame, and transfer-molding a thermosetting resin containing a light reflecting material in a space between the upper mold and the lower mold to form a resin-molded body (claim element 1[c]).

[FF53] After Everlight receives the plated lead frames from its suppliers, Everlight performs the step of applying the white thermosetting resin material to the lead frames. *See, e.g.*, (5/12/2015 AM Trial Tr., Dkt. No. 167, at 128:25-129:6; Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), Nos. 15 and 16.) Everlight performs this step using upper and lower molds to transfer-mold the thermosetting resin onto the upper and lower surfaces of the leads lead frames. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), Nos. 21 and 22.)

[FF54] The thermosetting resin material is CEL-W-7005D1. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), Nos. 17 and 18.) Hitachi Chemical provides this material, which contains a light reflecting material, to Everlight. *See* (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), Nos. 19 and 20.)

1[d] cutting the resin-molded body and the plated lead frame along the at least one notch to form a resin package, the resin package comprising a resin part and at least one lead, and the cutting step being performed such that an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer side surface of the resin package

[FF55] The process used to make the accused XI3030 and XI3535 series products also includes the step of cutting the resin-molded body and the plated lead frame along the at least one notch to form a resin package, the resin package comprising a resin part and at least one

lead, and the cutting step being performed such that an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer surface of the resin package (claim element 1[d]). (5/11/2015 AM Trial Tr., Dkt. No. 165, at 48:24-55-18.)

- The cutting of the resin molded body and lead frame is performed along the at least one notch to form a resin package comprising a resin part and at least one lead

[FF56] Everlight cuts the resin molded body and lead frame using a wheel-shaped saw blade. (05/12/2015 AM Trial Tr., Dkt. No. 167, at 125:24-126:21 (“We used the wheel blade to separate the components. That will also cut through the resin, as well as the connecting bars at the sides.”); 05/11/2015 AM Trial Tr., Dkt. No. 165, at 49:13-50:7.) This process, often referred to as “dicing” or “singulation,” is performed along at least one notch of the lead frame. (05/11/2015 AM Trial Tr., Dkt. No. 165, at 49:13-50:7.)

- The exposed metal surfaces on the outer surfaces of the XI3030 and XI3535 series products are the outer surfaces of the leads

[FF57] Each of the metal leads has bottom, top, and side surfaces. (PTX458); *see also* (PTX460.)

[FF58] These metal parts form the “anode” and “cathode” leads of the devices. *See, e.g.,* (5/12/2015 AM Trial Tr., Dkt. No. 167, at 124:12-125:4; Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 23 (“The leads on the bottom surface of the accused XI3030 and XI3535 series products conduct electricity from an external power source to the light emitting element.”).)

[FF59] The side surfaces of each lead extend to the outer side surfaces of the devices, and are visible in the external optical images and an X-ray image from the IAL/TAEUS Reports. (PTX458; PTX460); *see also* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 51:7-52:15.)

[FF60] Each of the two leads is a single, contiguous piece of metal. *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 52:10-15; 5/12/2015 AM Trial Tr., Dkt. No. 167, at 124:23-125:23.)

[FF61] The piece of metal exposed on the side surfaces is the same piece of metal that “conduct[s] electricity from an external power source to the light emitting element.” *See* (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 23.)

[FF62] Testing performed by Nichia confirmed that the side surfaces of the leads of the XI3030 and XI3535 series products “conduct electricity.” (5/11/2015 AM Trial Tr., Dkt. No. 165, at 52:18-53:9 (discussing PTX543 and PTX544).)

- *The cutting step is performed such that an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer side surface of the resin package.*

[FF63] The simultaneous cutting of the resin-molded body and lead frame results in the resin part and the leads “in [] substantially [the] same plane.” *See* (PTX458; Claim Construction Order, at 71;) *see also* (PTX460; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 53:10-55:18; 5/12/2015 AM Trial Tr., Dkt. No. 167, at 123:24-124:3.)

1[e] wherein the plated lead frame is cut so as to form an unplated outer side surface on the lead

[FF64] In the process used to make the accused XI3030 and XI3535 series products, the plated lead frame is cut so as to form an unplated outer side surface on the lead (claim element 1[e]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 55:19-56:14.)

[FF65] “The outer surfaces of the metal parts that are exposed on the outer side surfaces of the accused XI3030 and XI3535 series products are unplated.” (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 25.)

[FF66] The unplated outer side surfaces of the leads are visible in the optical images of the products and apparent from visual inspection of the samples of the accused XI3030 and XI3535 series products produced by Everlight. *See, e.g.* (PTX458; PTX460.)

Claim 7

[FF67] The Court finds that all of the claim limitations of Claim 7 of the '250 patent exist in and are met by the accused XI3030 and XI3535 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

7[a] The method according to claim 1, further comprising: providing a light emitting element in a concave portion of the resin package

[FF68] The process used to make the accused XI3030 and XI3535 series products includes the step of providing a light emitting element in a concave portion of the resin package (claim element 7[a]). (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 27 (“The accused XI3030 and XI3535 series products have a concave portion in the resin package.”), No. 28 (“The process used to make the accused XI3030 and XI3535 series products includes the step of providing a light emitting element in a concave portion of the resin package.”).)

7[b] wherein the transfer-molding step forms a plurality of concave portions corresponding to the convex portions of the upper mold, each of the concave portions comprising an inner bottom surface at which a portion of the lead frame is exposed

[FF69] In the process used to make the XI3030 and XI3535 series products, the transfer-molding step forms a plurality of concave portions corresponding to the convex portions of the upper mold, each of the concave portions comprising an inner bottom surface at which a portion of the lead frame is exposed (claim element 7[b]). *See* discussion, *supra* **FF52-FF54** regarding claim element 1[c]; (5/11/2015 AM Trial Tr., Dkt. No. 165, at 56:15-58:13.)

[FF70] The transfer-molding step uses an upper and lower mold. *See* discussion, *supra* at **FF52-FF54** regarding claim element 1[c]. The result of this step is the concave recess

visible in the accused XI3030 and XI3535 series products, which corresponds to the shape of the molds. The mold used to form the concave portion has a convex portion that defines the recess's concave shape. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 57:23-58:5 (“this convex portion translates into a concave portion in the molded part”).) Further, the concave portion has an inner bottom surface that exposes the lead frame, which is visible in the optical microscopy images of the XI3030 and XI3535 products. *See* (PTX458); *see also* (PTX460.)

- ii. The XI3030 and XI3535 Series Products Literally Infringe Claims 17 and 21 of the '250 patent.

Claim 17

[FF71] The Court finds that all of the claim limitations of Claim 17 of the '250 patent exist in and are met by the accused XI3030 and XI3535 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A light emitting device comprising

[FF72] “The accused XI3030 and XI3535 series products are light emitting devices.” Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 10. Each product includes at least one blue light emitting element. *See, e.g.*, (PTX458; PTX460.)

17[a] a resin package comprising a resin part and at least one lead

[FF73] “The accused XI3030 and XI3535 series products include a resin package that comprises a resin part and at least one lead” (claim element 17[a]). (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 15.)

[FF74] The metal exposed at the side surfaces of the resin packages (1) are contiguous pieces of metal that (2) conduct electricity as confirmed by the electrical testing in the IAL/TAEUS Reports. *See* discussion, *supra* at **FF57-FF62** regarding claim element 1[d].

17[b] wherein an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer surface of the resin package

[FF75] On the XI3030 and XI3535 series devices, an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer surface of the resin package (claim element 17[b]). *See* discussion, *supra* at **FF57-FF63** regarding claim element 1[d]; (PTX458; PTX460; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 53:10-55:18; 5/12/2015 AM Trial Tr., Dkt. No. 167, at 123:16-124:3.)

17[c] wherein a plating is disposed on an upper surface and a lower surface of the at least one lead

[FF76] For the accused XI3030 and XI3535 series products, a plating is disposed on an upper surface and a lower surface of the at least one lead (claim element 17[c]) and are visible in the optical images of the XI3030 and XI3535 series products and lead frames. (PTX458; PTX460; PTX553; PTX554.)

[FF77] Silver (Ag) plating is used on the upper and lower surfaces of the lead frame of the accused XI3030 and XI3535 series products. *See, e.g.*, (PTX058; PTX063.)

17[d] wherein an outer side surface of the at least one lead is unplated

[FF78] In the accused XI3030 and XI3535 series products, an outer side surface of the at least one lead is unplated (claim element 17[d]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 55:19-56:14.) “The outer surfaces of the metal parts that are exposed on the outer side surfaces of the accused XI3030 and XI3535 series products are unplated.” Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 25.) As discussed with respect to claim 1, the unplated outer side surfaces of the leads are visible in the optical images of the products, consistent with the manufacturing process of the accused XI3030 and XI3535 series products, and apparent from

visual inspection of the samples of the accused XI3030 and XI3535 series products produced by Everlight. *See, e.g.* (PTX458; PTX460); *see also* discussion, *supra* at **FF64-FF66**.

17[e] wherein a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead

[FF79] In the XI3030 and XI3535 products, “a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead [(claim element 17[e)).] (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 26.)

Claim 21

[FF80] The Court finds that all of the claim limitations of Claim 21 of the '250 patent exist in and are met by the accused XI3030 and XI3535 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

21[a] The light emitting device according to claim 17, wherein the at least one lead comprises two or more different levels

[FF81] For the accused XI3030 and XI3535 series products, the at least one lead comprises two or more different levels. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 60:3-24.) This feature of the XI3030 and XI3535 series products is ~~visible~~ in the optical images from the IAL/TAEUS Reports. *See, e.g.,* (PTX458; PTX460; PTX058; PTX063.)

- iii. The 62-217D and 62-257D Series Products Literally Infringe Claims 17, 19, and 21 of the '250 patent.

[FF82] The accused 62-217D and 62-257D series products use the same package design and lead frame. (5/12/2015 AM Trial Tr., Dkt. No. 167, at 130:17-25.) The primary difference between the 62-217D and 62-257D series products is the efficiency in which each emits light. *See* (5/12/2015 AM Trial Tr., Dkt. No. 167, at 130:17-21.) As such, these products are addressed together.

Claim 17

[FF83] The Court finds that all of the claim limitations of Claim 17 of the '250 patent exist in and are met by the accused 62-217D and 62-257D series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A light emitting device comprising

[FF84] The accused 62-217D and 62-257D series products are light emitting devices. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 29.)

17[a] a resin package comprising a resin part and at least one lead

[FF85] The accused 62-217D and 62-257D series products include a resin package that comprises a resin part and at least one lead (claim element 17[a]). (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 30.)

17[b] wherein an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer surface of the resin package

[FF86] For the accused 62-217D and 62-257D series products, an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer surface of the resin package (claim element 17[b]). (5/11/2015 AM Trial Tr., Dkt. No. 165, at 62:8-63:9.) An outer surface of the resin part and an outer surface of the at least one lead are in a substantially same plane at an outer surface of the resin package. The planarity of the outer surface of the lead and the outer surface of the resin part at the outer surface of the resin package is visible in the optical and x-ray images of the products. *See, e.g.*, (PTX463; PTX461; PTX123; PTX121; PTX1202; PTX1203.)

17[c] wherein a plating is disposed on an upper surface and a lower surface of the at least one lead

[FF87] For the accused 62-217D and 62-257D series products, a plating is disposed on an upper surface and a lower surface of the at least one lead (claim element 17[c]).

[FF88] These plating layers are visible in the optical images of the products, and confirmed by Everlight's documents. As part of the lead frame approval process, Everlight verifies that there is silver (Ag) plating on the upper and lower surfaces of the molded lead frame. *See, e.g.*, (PTX463; PTX461; PTX1204; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 63:16-24.)

17[d] wherein an outer side surface of the at least one lead is unplated

[FF89] For the accused 62-217D and 62-257D series products, an outer side surface of the at least one lead is unplated (claim element 17[d]), except for incidental plating material that is not directly applied to the exposed outer side surface. *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 64:5-22; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 134:4-23.) The unplated outer side surfaces of the leads are visible in the optical images of the products and apparent from visual inspection of the product samples of the accused 62-217D and 62-257D series produced by Everlight. *See* (PTX463; PTX461; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 64:5-21.)

[FF90] Further, no plating process is applied to the exposed outer side surface of the at least one lead identified above during the manufacture of the accused 62-217D and 62-257D series products. *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 64:5-22; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 134:4-23.)

17[e] wherein a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead

[FF91] For the accused 62-217D and 62-257D series products, a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead (claim element 17[e]). (5/11/2015 AM Trial Tr., Dkt. No. 165, at 64:25-65:18); *see also* (PTX463; PTX461; PTX548; PTX547.) A portion of the resin part is located over a portion of the plating on the upper surface of the at least one lead. However, the resin part is not located over all of the plating. *See, e.g.*, (PTX463.) The portions of the plated lead near the light emitting element(s) remain uncovered.

Claim 19

[FF92] The Court finds that all of the claim limitations of Claim 19 of the '250 patent exist in and are met by the accused 62-217D and 62-257D series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

19[a] The light emitting device according to claim 17, wherein the at least one lead comprises a step on a bottom surface or outer surface thereof

[FF93] “For the accused 62-217D and 62-257D series products, the at least one lead comprises a step on an outer surface thereof.” (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 31.)

Claim 21

[FF94] The Court finds that all of the claim limitations of Claim 21 of the '250 patent exist in and are met by the accused 62-217D and 62-257D series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

21[a] The light emitting device according to claim 17, wherein the at least one lead comprises two or more different levels

[FF95] For the accused 62-217D and 62-257D series products, the at least one lead comprises two or more different levels. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 66:5-67:3); *see, e.g.*, (PTX463; PTX461.)

- iv. The 45-21S Series Products Literally Infringe Claims 17, 19, and 21 of the '250 patent.

Claim 17

[FF96] The Court finds that all of the claim limitations of Claim 17 of the '250 patent exist in and are met by the accused 45-21S series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A light emitting device comprising

[FF97] The accused 45-21S series products are light emitting devices. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 32.)

17[a] a resin package comprising a resin part and at least one lead

[FF98] The accused 45-21S series products include a resin package that comprises a resin part and at least one lead (claim element 17[a]). (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 33.)

17[b] wherein an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer surface of the resin package

[FF99] For the accused 45-21S series products, an outer surface of the resin part and an outer surface of the at least one lead are planar at an outer surface of the resin package (claim element 17[b]). (5/11/2015 AM Trial Tr., Dkt. No. 165, at 67:17-68:1.) An outer surface of the resin part and an outer surface of the at least one lead are in a substantially same plane at an outer surface of the resin package. The planarity of the outer surface of the lead and the outer surface

of the resin part at the outer surface of the resin package is visible in the optical and x-ray images of the products. *See, e.g.*, (PTX538; PTX099, PTX102, PTX104.)

17[c] wherein a plating is disposed on an upper surface and a lower surface of the at least one lead

[FF100] For the accused 45-21S series products, a plating is disposed on an upper surface and a lower surface of the at least one lead (claim element 17[c]).

[FF101] These plating layers are visible in the optical images of the products. *See, e.g.*, (PTX538; PTX102; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 68:2-15.) As part of the lead frame approval process, Everlight verifies that there is silver (Ag) plating on the upper and lower surfaces of the molded lead frame. *See* (PTX102.)

17[d] wherein an outer side surface of the at least one lead is unplated

[FF102] For the accused 45-21S series products, an outer side surface of the at least one lead is unplated (claim element 17[d]). The unplated outer side surfaces of the leads are visible in the optical images of the products and apparent from visual inspection of the product samples of the accused 45-21S series produced by Everlight, processed and imaged by IAL/TAEUS, and analyzed by Prof. Schubert. *See* (PTX538.)

[FF103] An outer side surface of the 45-21S is unplated. (PTX096; 5/12/2015 AM Trial Tr., Dkt. No. 167, at 127:8-128:23); *see also* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 68:16-69:22.)

[FF104] As with the 62-217D and 62-257D products, no plating process is applied to the exposed outer side surface of the at least one lead identified above during the manufacture of the accused 45-21S series products. It is “unplated.” *See* discussion, *supra* at **FF89-FF90** regarding element 17[d] and the 62-217D and 62-257D series products; (PTX099.)

17[e] wherein a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead

[FF105] For the accused 45-21S series products, a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead (claim element 17[e]). (5/11/2015 AM Trial Tr., Dkt. No. 165, at 69:23-70:16); *see also* (PTX538; PTX549.) A portion of the resin part is located over a portion of the plating on the upper surface of the at least one lead.

[FF106] For the accused 45-21S series products, a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead; however, the resin part is not located over all of the plating. *See, e.g.*, (PTX538.) The portions of the plated lead near the light emitting element(s) remain uncovered. (PTX538; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 70:5-14; PTX549.)

Claim 19

[FF107] The Court finds that all of the claim limitations of Claim 19 of the '250 patent exist in and are met by the accused 45-21S series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

19[a] The light emitting device according to claim 17, wherein the at least one lead comprises a step on a bottom surface or outer surface thereof

[FF108] “For the accused 45-21S series products, at least one lead comprises a step on an outer surface thereof.” (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 35.); *see also* (PTX538.)

Claim 21

[FF109] The Court finds that all of the claim limitations of Claim 21 of the '250 patent exist in and are met by the accused 45-21S series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

21[a] The light emitting device according to claim 17, wherein the at least one lead comprises two or more different levels

[FF110] For the accused 45-21S series products, the at least one lead comprises two or more different levels. *See, e.g.*, (PTX538; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 70:24-71:23.).

F. The '250 patent Would Not Have Been Obvious in Light of the Prior Art Asserted by Defendants

[FF111] The Court finds that the '250 patent would not have been obvious in view of Japanese Patent Application Publication Tokukai No. 2007-235085 ("Hitachi") (DTX356), as modified by Japanese Patent Application Publication Tokukaihei 11-191562 ("Sanyo") (DTX352), or U.S. Patent 6,433,277 ("Glenn") (DTX336). The reasoning and further factual findings underpinning such are discussed in further detail below.

i. The Disclosure From the References on Which Defendants Rely as Compared to the Asserted Claims

1. Hitachi Is Directed to the Manufacture of an LED Device on a Flat, Partially Plated Printed Circuit Board, and Not on a Notched, Fully-Plated Lead Frame

[FF112] The principal prior art reference on which Defendants rely, Hitachi, is entitled "Method for Producing Package Substrate for Mounting Optical Semiconductor Element and Method for Producing Optical Semiconductor Device Using the Same." (5/13/2015 AM Trial Tr., Dkt. No. 170, at 8:2-9:1, 113:8-17.)

[FF113] Hitachi was disclosed to the U.S. Patent and Trademark Office during prosecution of the '250 patent. ('250 patent, page 2, "Foreign Patent Documents;" 5/13/2015

AM Trial Tr., Dkt. No. 170, at 113:8-14.) Moreover, Hitachi is discussed in the '250 patent's specification, where it is referred to as "Patent Document 4." ('250 patent, col. 2, ll. 43-44; 5/13/2015 Trial Tr., Dkt. No. 170, at 113:8-23.)

[FF114] Hitachi is directed to a method for producing optical semiconductor mounting package substrates and devices. (Hitachi, ¶ [0001]) More specifically, Hitachi is directed to "a method for producing an optical semiconductor element package substrate which method allows a shorter lead time, higher productivity due to a reduction in the number of members to be used and production processes, and a lower cost[.]" (Hitachi, page 1 ("[Object]").) Hitachi is further directed to:

A method for producing an optical semiconductor element mounting package substrate having a light reflecting thermosetting resin composition layer which is provided on a circuit board and in which two or more recesses each serving as an optical semiconductor element mounting region are provided, the light reflecting thermosetting resin composition layer being formed by transfer molding.

(Hitachi, page 1 ("[Means to Achieve the Object]"); *id.*, ¶ [0011].)

[FF115] As the background section of the '250 patent explains, the Hitachi reference discloses a device in which the substrate is a circuit board, for which a lead frame can be substituted; the circuit board/lead frame have a "flat plate shape":

As a different light emitting device and manufacturing method therefor, an optical semiconductor element mounting package substrate which has a light reflecting thermosetting resin composition layer on the wiring substrate, and manufacturing method therefor are disclosed (*e.g.*, refer to Patent Document 4 [Hitachi]). . . . However, these wiring board and lead frame have a flat plate shape and have a small adhering area because a thermosetting resin composition is arranged on this flat shape, and therefore there is a problem that, for example, a lead frame and thermosetting resin composition are likely to be detached during singulation.

('250 patent, col. 2, ll. 13-18, 30-35.)

[FF116] The lead frame disclosed in Hitachi is not the same type of lead frame disclosed in the '250 patent. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 114:21-115:2.)

[FF117] The methods and devices that Hitachi describes use a printed circuit board as a substrate. *See, e.g.* (Hitachi, ¶ [0034] (“The circuit board to be used in the present invention is exemplified by a publicly known circuit board, which is not particularly limited. For example, it is possible to use not only the printed circuit board but also a leadframe, a flexible circuit board, and a metal base circuit board”)); *see also* (*id.* ¶ [0024], Fig. 1, ¶¶ [0035]-[0039].)

[FF118] Hitachi does not teach or suggest a lead frame with a particular configuration, or disclose manufacturing steps and modifications that would be necessary to use a lead frame in place of the disclosed printed circuit board. *See, e.g., (id.)*; *see also* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 94:22-25.)

[FF119] More specifically, Hitachi does not teach a lead frame with a notch as specified in the '250 patent. The '250 patent requires a notch configured as “an opening that penetrates the lead frame.” (Claim Construction Order, at 66.) The '250 patent further specifies that the notch be situated so that singulation (dicing) occurs along the notch. *See, e.g.,* ('250 patent, claim 1.) Hitachi does not disclose such a structure. *See, e.g.,* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 95:1-3.)

[FF120] Hitachi teaches a device in which the positive and negative lead electrodes 105 are separated by a reflector element 103. (Hitachi, Fig. 2, ¶ [0055] (defining element 103 as a “Reflector”).) Hitachi further discloses an embodiment in which the LED chip 100 is mounted directly on reflector element 103. (*Id.*, Fig. 2(b).) Singulation of the device through the reflector element 103 – that is, treating the reflector element 103 as a singulation notch – would result in

singulation through the recess cavity in which the LED chip is housed, and therefore result in destruction of the device. (Hitachi, Fig. 2.)

[FF121] Hitachi teaches singulation of individual packages along dicing lines 20, which are between the recesses 420. (Hitachi, ¶ [0038], Fig. 6.) Hitachi does not disclose or suggest the presence of openings that penetrate the lead frames along the dicing lines 20. *See (id.*, Fig. 1 (showing a continuous, flat surface along the top surface of the substrate, including in the areas between the recesses 420 where Fig. 6 shows the dicing lines)); *see also* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 95:1-3.)

[FF122] Hitachi does not disclose a step of plating the recess before the molding step. Rather, Hitachi discloses local plating *only* on the surface of the substrate that is exposed at the bottom of the recess after the molding step. (Hitachi, ¶ [0024] (describing the encapsulation of the circuit board with a resin to provide recesses 420; “[f]urther, it is possible to subject, to Ni/Ag plating 104 by, for example, electroplating, a surface of a terminal which is provided on a bottom surface of each of the two or more recesses[.]”)); *see also* (Figs. 1(c), 2(a), 2(b) (showing plating element 104 located on the bottom surface of the recess)); 5/13/2015 PM Trial Tr., Dkt. No. 171, at 96:5-6.)

[FF123] Hitachi’s disclosure of plating 104 of the metal substrate *only* on the bottom of recesses 420, where the LED chip is located (*see* Fig. 2), is consistent with the disclosed function of the plating, which is light reflection. (*Id.*, ¶ [0035] (“In this case, a surface of the substrate is desirably silver-plated so that light from an LED element can be efficiently reflected”).)

[FF124] Hitachi does not disclose singulation of individual LED devices by cutting along an opening in the lead frame. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 95:1-3, 96:3-4.)

[FF125] Hitachi does not disclose plating the top and/or bottom surface of the substrate (lead frame or otherwise) before molding. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 96:5-6.)

[FF126] Hitachi does not disclose disposition of resin over a plated portion of a lead frame. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 95:4-6, 96:7-9.)

[FF127] Hitachi does not disclose a step on a bottom surface or outer surface of a lead. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 96:10-12.)

[FF128] Hitachi does not disclose a lead with two levels. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 96:13-14.)

[FF129] Hitachi does not disclose and would not have suggested at least the following elements of the asserted claims of the '250 patent:

- “a lead frame comprising at least one notch” (claim element 1[a]);
- “cutting the resin-molded body and the plated lead frame along the at least one notch to form a resin package”(claim element 1[d]);”
- “a plating is disposed on an upper surface and a lower surface of the at least one lead” (claim element 17[c]);
- “a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead” (claim element 17[e]);
- “the at least one lead comprises a step on a bottom surface or outer surface thereof” (claim element 19[a]); and
- “the at least one lead comprises two or more different levels” (claim element 21[a]).

(5/13/2015 PM Trial Tr., Dkt. No. 171, at 94:22-96:14.)

2. Sanyo is Directed to an Electronic Semiconductor Device in which Transistors are Mounted on a Substrate and then Completely Covered with Resin to Protect them from Light.

[FF130] Japanese Patent Application Publication Tokukaihei 11-191562 (“Sanyo”) was published in 1999. It is entitled “Method for Producing Semiconductor Device.”

[FF131] Sanyo is directed to a process for manufacturing traditional integrated circuits (ICs) or semiconductor chips (electronic semiconductor devices) such as transistors. *See* (Sanyo, Abstract, ¶¶ [0003], [0015].) The semiconductor devices disclosed in Sanyo are transistors. *See, e.g., (id. ¶¶ [0014], [0030].)* Sanyo states that the disclosed method can be applied to different types of transistors, such as a power MOSFET (field-effect transistor), insulated-gate bipolar transistor (IGBT), or heterojunction bipolar transistor (HBT). (*Id.* ¶ [0030].)

[FF132] Sanyo is not directed to light emitting devices or the manufacture of such devices. Sanyo does not refer to LEDs or opto-electronic devices of any kind. The Sanyo reference does not include the words “opto-,” “light,” “LED,” or any other terms associated with LEDs or optoelectronics.

[FF133] The process disclosed in Sanyo includes the following steps:

Prepare a lead frame 30 which has at least islands 33 and lead terminals 34. Each of the lead terminal 34 is held via recessed parts 36. Semiconductor chips 39 are subjected to die-bonding and wire-bonding, and all the semiconductor chips 39 together are molded with resin 41. Resin 40 on the back surface side is partially removed so that a metal surface is exposed at a location for serving as an external connection electrode. The resin 41 is cut on the center of the recessed parts 36 of the lead terminals 34 so as to surround the semiconductor chip 39, thereby semiconductor devices are separated from each other.

(Sanyo, Abstract.)

[FF134] The process disclosed in Sanyo thus teaches the steps of die-bonding and wire-bonding electronic semiconductor chips on a lead frame or other substrate, and subsequently covering the entire die- and wire-bonded structure with a resin. *See* (Sanyo,

Abstract (semiconductor chips 39 are subjected to die bonding and wire-bonding, and then all the semiconductor chips together are molded with resin 41), ¶ [0016] (“Subsequently, the entire members are subjected to resin molding”).) Sanyo further teaches that the resin layer of the disclosed device should “cover all the semiconductor chips 39 together.” *See* (Sanyo, ¶ [0016].)

[FF135] A purpose of the resin element disclosed in Sanyo is to protect the chip-and-wire structure. (Sanyo, ¶ [0016] (“A thermosetting sealing resin layer 41 such as epoxy resin is formed on the lead frame 30 so as to seal and protect the element mount sections 31, 31A, and so forth, the semiconductor chips 39, and the wires 40”).) Moreover, it is generally understood that “[w]ith an IC or general semiconductor, you usually want to prevent light from getting into the package.” (5/12/2015 PM Trial Tr., Dkt. No. 168, at 122:17-20.)

[FF136] In the device disclosed in Sanyo, a limited portion of the bottom surface of the lead frame is exposed following molding of the resin to provide locations for an external electrical connection. *See* (Sanyo, ¶¶ [0016], [0018].) Specifically, Sanyo discloses plating the lower surface of the lead frame in slits 42 carved into the resin following the molding process. (Sanyo, ¶ [0018] (“Then, a plating layer 43 . . . is formed on a surface of the lead terminal 34 exposed in the slit 42”).)

[FF137] Aside from plating the carved slits 42, Sanyo’s only other disclosure regarding plating is the localized plating of “island surfaces” to allow a “eutectic connection” of the chips in place of a conductive paste. *See* (Sanyo, ¶ [0013] (“Alternatively, it is possible to plate island surfaces with gold and connect semiconductor chips on the platings by eutectic connection.”).)

[FF138] Sanyo discloses a package that, after molding, has a “substantially rectangular parallelepiped shape.” (Sanyo, ¶ [0020].) Sanyo does not disclose a resin package having a concave portion, or a housing in which a light emitting element is mounted in a concave portion

of a resin package. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 99:2-3); *see, e.g.*, (Sanyo, ¶ [0016], Figs. 3(b), 4(b), 5(b).)

[FF139] Sanyo does not disclose an upper mold having a convex portion or a molding step that forms a plurality of concave portions in the device's resin housing corresponding to the convex portions of the upper mold. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 99:4-5); *see, e.g.*, (Sanyo, ¶ [0016] (referring to the molding process that results in the shape shown in Fig. 3(b)), ¶ [0017] (referring to upper and lower molds), ¶ [0018] (referring to cross-sections of the resulting molding process shown in Fig. 4(b)), ¶ [0020] (the result of the molding is a “substantially rectangular parallelepiped shape”).)

[FF140] Sanyo does not disclose concave portions of the device's resin housing that comprise an inner bottom surface at which a portion of the lead frame is exposed. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 99:4-5); *see, e.g.*, (Sanyo, ¶ [0016] (referring to the molding process that results in the shape shown in Fig. 3(b)), ¶ [0017] (referring to upper and lower molds), ¶ [0018] (referring to cross-sections of the resulting molding process shown in Fig. 4(b)), ¶ [0020] (the result of the molding is a “substantially rectangular parallelepiped shape”).)

[FF141] Sanyo does not disclose a device or a manufacturing method that includes a thermosetting resin containing a light reflecting material. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 98:24-99:1); *see, e.g.*, (Sanyo, ¶ [0016] (“A thermosetting sealing resin layer 41 such as epoxy resin is formed on the lead frame 30 so as to seal and protect the element mount sections 31[.]”).)

[FF142] Sanyo does not disclose, and would not have suggested, all of the elements of the asserted claims of the '250 patent. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 98: 17-99:9.)

3. Glenn is Directed to Integrated Circuits Entirely Covered with a Resin for Protection from Light.

[FF143] U.S. Patent 6,433,277 (“Glenn”) issued on August 13, 2002. It is entitled “Plastic Integrated Circuit Package and Method and Leadframe for Making the Package.” Glenn is directed to packages for integrated circuit die and methods of making such packages. *See* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 116:25-117:2); *see, e.g.*, (Glenn, Title; col. 1, ll. 19-35.) Glenn explains that “[i]ntegrated circuit die are conventionally enclosed in plastic packages that provide protection from hostile environments and enable electrical interconnection between the integrated circuit die and printed circuit boards.” (Glenn, col. 1, ll. 19-35.)

[FF144] Glenn is not directed to light emitting devices or the manufacture thereof. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 99:11-15.)

[FF145] Glenn teaches the steps of (i) placing integrated circuit die onto a die pad; (ii) electrically connecting the die to the die pad; (iii) applying an encapsulant material to the surface of the lead frame; (iv) “covering the frame, die, die pad, and peripheral side surfaces of the die pad and tabs with [an] encapsulant material;” (v) plating exposed surfaces of the lead frame with metal; and (vi) cutting the encapsulated lead frame and encapsulant material with a saw. *See, e.g.*, (Glenn, Figs. 1, 8:)

[FF146] Glenn teaches the steps of (i) placing an integrated circuit die onto a die pad, and then (ii) covering the entire top surface substrate, including the chips and wires, in the encapsulant:

Step 4 places the leadframe on a flat surface, with the die facing upwards, and applies a viscous encapsulant material onto the upward facing first surface of the leadframe. The encapsulant material is then hardened. The encapsulant material covers the die, the bond wires, a first surface of the tabs, the first surface of the die pad, the side surfaces of the die pad and tabs, and all or part of the frames around the die pad.

(Glenn, col. 1, ll. 22-29.) Glenn teaches that the encapsulant material is disposed so as to cover the entire top surface of the structure, including “the frame, die, pad, and peripheral side surface of the die pad and tabs” (Glenn, Fig. 1, Step 4); *see* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 118:1-15.)

[FF147] According to Glenn, the integrated circuit die should be enclosed in a material such as HYSOL 4450 or similar compound to protect the die from hostile environments. *See, e.g.,* (Glenn, col. 1, ll. 19-21 (“Integrated circuit die are conventionally enclosed in plastic packages that provide protection from hostile environments[.]”), col. 7, ll. 19-21 (“As a fourth step, a conventional hardenable viscous material suitable for encapsulating packages, such as HYSOL 4450 encapsulant, is applied with the dam so that the incomplete package within the dam is covered with encapsulant material”); col. 7, ll. 35-38 (“Example molding compounds include NITTO MP-8000AN molding compound from Nitto Company of Japan, and EME 7351 UT molding compound from Sumitomo Company of Japan.”); *see* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 118:1-15.)

[FF148] HYSOL 4451 and 4450, NITTO MP-8000AN, and EME 7351 UT are black, light-absorbing resins. (5/13/2015 AM Trial Tr., Dkt. No. 170, at 118:10-119:18.)

[FF149] Glenn teaches that the first (top) and side surfaces of the die pad are covered with molding resin. (Glenn, col. 2, ll. 47-48, col. 3, ll. 4-9, col. 6, l. 57 – col. 7, l. 2.)

[FF150] Glenn does not disclose a resin package having a concave portion. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 99:19-22.) Following the molding step, the package disclosed in Glenn is a “single solid block.” (Glenn, Figs. 8-9; col. 2, ll. 30-33; col. 7, ll. 23-2.)

[FF151] Glenn does not disclose a transfer-molding step that forms a plurality of concave portions corresponding to a convex portions of an upper mold, where each of the

concave portions comprise an inner bottom surface at which a portion of the lead frame is exposed. (*Id.*); *see* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 99:21-22.)

[FF152] Glenn does not disclose the use of a thermosetting resin containing a light reflecting material. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 99:16-18.)

[FF153] Glenn does not disclose, and would not have suggested, all of the elements of the asserted claims of the '250 patent. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 99:11-100:1.)

ii. The Asserted Claims of the '250 patent Would Not Have Been Obvious to One of Ordinary Skill in the Art.

[FF154] None of the prior art references on which Defendants rely (Hitachi, Sanyo, Glenn) discloses the combinations of elements found in the asserted claims of the '250 patent. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 88:16-89:13.)

1. It Would Have Not Been Obvious to a Person of Ordinary Skill in the Art in 2007 that Modification of the Device that Hitachi Discloses in Detail by Substituting Elements from Glenn and Sanyo Would Predictably Yield a Viable LED Package.

[FF155] The LED to which Hitachi is directed, and the general semiconductor field to which Glenn and Sanyo are directed, concern devices with different features and purposes. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 122:17-24); *see also* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 14:24-15:4.)

[FF156] Furthermore, (i) there are differences between the MAP QFN process as used in the fabrication of an integrated circuit or other general semiconductor device (such as the devices disclosed in Sanyo and Glenn) and the MAP QFN process used in the fabrication of an LED package; and (ii) even within each technical field (the general MAP-QFN process and the LED MAP-QFN process), there are many varieties in both methods. *See* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 114:6-115:23.)

[FF157] In light of the competing considerations that underlie the design of an LED package, it would not have been obvious to a person of ordinary skill in the art that the combination of Hitachi with Sanyo or Glenn would predictably have yielded a viable LED device or a process for manufacturing such a device. *See, e.g.*, (5/13/2015 AM Trial Tr., Dkt. No. 170, at 6:9-17); *but see* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 114:6-115:23

2. A Person of Ordinary Skill in the Art Would Have Dismissed
References Relating to Electronic Devices, Such as Sanyo or Glenn, as
Unsuitable for the Design and Development of an LED Device

[FF158] The purposes of electronic devices, such as integrated circuits and transistors, and optoelectronic devices, such as LEDs, are different. The purpose of a light emitting device is to emit light. By contrast, an integrated circuit or similar device is sensitive to light. Accordingly, “[w]ith an LED, you want to get light out. With an IC or general semiconductor, you usually want to prevent light from getting into the package.” (5/12/2015 PM Trial Tr., Dkt. No. 168, at 122:17-20.)

[FF159] In view of these differences, a person of ordinary skill involved in the design or development of a new LED device or method for manufacturing an LED device would have dismissed references such as Sanyo or Glenn that are directed to the design and manufacture of electronic semiconductor devices (*e.g.*, integrated circuits), rather than LEDs. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 91:7-20.)

[FF160] The different considerations in the design and manufacture of electronic and optoelectronic devices result in substantial differences in the manufacturing processes and materials used in the different technologies. *See, e.g.*, (5/13/2015 PM Trial Tr., Dkt. No. 171, at 89:20-90:25, 92:9-93:8, 97:3-98:16.)

[FF161] For these reasons, a change in the design or manufacture of an LED or other optoelectronic device requires the consideration of factors – including factors such as light emission, and the effects of heat and emitted radiation on different resins and other materials—that are not relevant to the design and manufacture of electronic semiconductor devices. Moreover, the transfer of features relating to design and manufacture of an electronic semiconductor device and an LED device involve different challenges, such as electrical, optical, thermal, mechanical, fabrication, and cost. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 93:21-94:14.)

3. Glenn and Sanyo Do Not Disclose, and Expressly Teach Away From, the Requirement of Claim 17 that “a Portion of the Resin Part is Disposed Over a Portion of the Plating on the Upper Surface of the at Least One Lead.”

[FF162] Hitachi discloses only localized plating after molding. *See, e.g.*, (Hitachi, Fig. 2, element 104; ¶ [0024] (plating on the bottom surfaces of the recess).) Accordingly, Hitachi does not disclose that “a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead” as required by claim 17.

[FF163] The Sanyo and Glenn references expressly teach away from that missing element of Hitachi. Both of these references make clear that it is necessary to cover the entire surface with the protective resin; *i.e.*, the resin must be disposed over “all.” *See, e.g.*, (Sanyo, ¶ [0016]; Glenn, col. 1, ll. 22-29, Fig. 8; 5/12/2015 PM Trial Tr., Dkt. No. 168, at 122:17-20.)

[FF164] Because Sanyo and Glenn teach away from this feature of claim 17, they cannot be combined with Hitachi to render obvious claim 17.

4. It Would Not Have Been Obvious to Combine Hitachi With Sanyo or Glenn, to Reach the Claims of the '250 patent.

[FF165] As explained in the specification of the '250 patent and accepted by the examiner during prosecution of the '250 patent, Hitachi is directed to “a conventional light

emitting device” manufactured by molding “a printed-wiring board [or lead frame] having a flat plate shape.” (’250 patent, col. 2, ll. 19-28.)

[FF166] Hitachi does not disclose a lead frame with a notch – that is, with “an opening that penetrates the lead frame.” As explained in the ’250 patent, the substrate of the device disclosed in Hitachi is a flat structure with no openings or other specified features. *See* (Hitachi, ¶ [[0034] (“The circuit board to be used in the present invention is exemplified by a publicly known circuit board, which is not particularly limited.”), ¶ [0035] (“The printed circuit board can be obtained by, for example, forming, by using a publicly known method, wiring serving as a circuit on a prepreg with copper foil, and thereafter forming an insulating resin on the circuit.”)); *see also* (’250 patent, col. 2, ll. 23-25 (referring to Hitachi); ll. 30-33 (“However, these wiring board and lead frame have a flat plate shape”).) Hitachi does not disclose in its written description or in its Figures an opening that penetrates the substrate. *See, e.g.*, (Hitachi, Fig. 1.)

[FF167] Glenn and Sanyo incorporate a substrate with through-holes prepared by means of etching, stamping, or similar processes. Sanyo discloses a lead frame with a plurality of element mount sections 31, arranged in a plurality of repetitive patterns, each of which includes at least an island 33 and a plurality of lead terminals 34, with each of the terminals connected to each other by connection bars 35. (Sanyo, ¶ [0010]). Glenn similarly discloses a metal lead frame that includes die pads, and a plurality of finger-like rectangular tabs extending from the frame towards the die pad without touching it. The die pad and tabs have peripheral side surfaces that include re-entrant portions and asperities. (Glenn, col. 2, ll. 4-15.) Glenn states that the substrate disclosed in that reference can be fabricated by preparing a metal thin plate and then etching or stamping the metal. (Glenn, col. 5, ll. 43-49.) Glenn discloses that the

lead frame specified in that reference can be made by controlled etching, stamping, or a combination of processes. (Glenn, col. 5, l. 49 – col. 6, l. 34.)

[FF168] A person of ordinary skill in the art in 2007 would not have modified the structure disclosed in Hitachi, which is directed to a device that is simple, low-cost, and requires few processing steps, with a lead frame that has the features disclosed, or that requires the processing steps as disclosed in, Sanyo or Glenn.

[FF169] Accordingly, nothing in Sanyo or Glenn would have suggested replacing the flat circuit board of Hitachi with a lead frame with at least one notch, and the cutting of a resin molded body and plated lead frame along the at least one notch.

[FF170] It would not have been obvious to a person of ordinary skill in the art in 2007 to modify Hitachi to include either (i) “plating . . . disposed on an upper surface and a lower surface of the at least one lead,” or (ii) “a portion of the resin part is disposed over a portion of the plating on the upper surface of the at least one lead,” as required by claim 17 of the ’250 patent. Hitachi already discloses plating, and there would have been no reason for one skilled in the art to deviate from the express teachings of Hitachi.

[FF171] Glenn and Sanyo do not remedy this deficiency of Hitachi. Glenn and Sanyo disclose only applying resin over “all” of the lead frame, and thus, cannot be relied upon to teach this limitation. One of ordinary skill in the art would not have considered adapting the plating scheme specified in Hitachi by reference to the different plating schemes disclosed in the other references. Hitachi specifies that the purpose of the plating is to enhance light-reflection rather than light-absorption. (Hitachi, ¶ [0035] (“In this case, a surface of the substrate is desirably silver-plated so that light from an LED element can be efficiently reflected.”); *see also*

(5/13/2015 PM Trial Tr., Dkt. No. 171, at 97:7-20.) Hitachi offers no reason or suggestion to plate additional portions of the lead on either the upper or the lower surface.

iii. Objective Indicia Confirm that the Asserted Claims of the '250 patent Would Not Have Been Obviousness

1. At Least Claims 1 and 17 of the '250 patent Cover Nichia Products.

[FF172] Each of the Nichia products within the 757 series of LED products share the same overall package design and are manufactured according to the same process as relevant to the limitations of the asserted claims of the '250 patent.

[FF173] The 757 series products include each and every limitation of, and therefore practice claims 1, 7, 17, and 21 of the '250 patent. *See also* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 100:23-106:4; PTX1147; PTX1265; PTX1268; PTX1273; PTX1274; PTX1150; PTX1152; PTX1156; PTX1158); *see, e.g.*, (PTX1136; PTX1137; PTX1139; PTX1140.)

[FF174] Nichia's 757 series of LED products (i) are manufactured by the steps set forth in at least claim 1 of the '250 patent, and (ii) have the features specified in at least claim 17 of the '250 patent. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 100:23-106:5.)

2. Nichia's Covered Products Have Received Industry Praise, Have Achieved Commercial Success, and Met a Long-Felt But Unmet Need

[FF175] A 2013 article in *LEDinside* publication reported on industry praise and recognition for Nichia's 757 product, stating that Nichia's 757 series "ignited" the "expansion trend in that category." (PTX829 ("2013 Review EMC Production Expansion Could Mean Trouble for PCT").)

[FF176] Moreover, the industry had experienced a long-felt but unmet need for an alternative to incandescent lighting technology. Incandescent lights consume large amounts of energy for a given output of light, and the alternative that followed – fluorescent lighting – contains toxic components. With the advent of Nichia's 757 series and related products, "there

is the availability of low-cost devices that emit a significant amount of light that can be used in light bulbs and emit a pleasant, low-cost light.” (5/13/2015 PM Trial Tr., Dkt. No. 171, at 106:13-107:3.)

[FF177] Between 2010 and 2013, Nichia’s sales of the products that practice the ’250 patent increased from three percent of Nichia’s total sales volume, to 27 percent. In 2013, Nichia sold over 13.9 billion units, with revenues of \$1.7 billion. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 122:6-10.) The 757 series products themselves showed a similar increase, from 25 million units in 2011 to 2.5 billion units in 2013. In the eight months from January to August 2014, Nichia sold nearly 2.7 billion units of the products in the 757 series. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 123:4-18.)

[FF178] Although the products in Nichia’s 757 series are advertised and marketed as having an “EMC” (thermosetting resin-type) package, the overall structure and design of the package is important to consumers. The products in the 757 series are brighter, they have a long life, they are reliable, they have a low cost, and they can be fabricated quickly to meet customer demand. (5/12/2015 AM Trial Tr., Dkt. No. 167, at 115:25-118:25.) The brightness relates to (i) the resin, (ii) the plated lead frame, and (iii) the fact that the design allows for thin package walls, which allows for better emission of light (for example, by mounting a larger chip). (5/12/2015 AM Trial Tr., Dkt. No. 167, at 116:11-19.) The long life and reliability are attributable to the thermosetting resin (which does not discolor in the presence of light), a heat-resistant package design, and a notch in the lead frame that contributes to the package’s adhesiveness. In addition, by plating the lead frame before molding, Nichia avoids possible contamination to bonding sites that can reduce the reliability of the bonding process. (5/12/2015 AM Trial Tr., Dkt. No. 167, at 116:20-118:5.) The design and manufacturing process contribute

to low cost by allowing Nichia to make many more packages at once. Prior industry practice was to make about 100 packages per lead frame; Nichia makes approximately 2,400 packages per lead frame of its 157 product, and 1,200 packages per lead frame of its 757 product. (5/12/2015 AM Trial Tr., Dkt. No. 167, at 118:6-20.) Finally, the advanced manufacturing process allows Nichia to respond quickly to customer orders. (5/12/2015 AM Trial Tr., Dkt. No. 167, at 118:21-25.)

[FF179] In sum, Nichia products covered by the '250 patent (i) have received industry recognition, (ii) satisfy a longstanding but unmet need, and (iii) have achieved commercial success. The features of the products in the 757 series are included in the asserted claims of the '250 patent, and these features in turn have contributed to the products' commercial success.

VI. U.S. Patent No. 7,432,589

A. Summary of the '589 patent

[FF180] The '589 patent is entitled "Semiconductor Device" and issued on October 7, 2008. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 36.)

[FF181] The '589 patent lists Saiki Yamamoto, Ikuya Nii, and Hiroaki Ukawa as the named inventors. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 37.)

[FF182] The earliest priority date for the asserted claims of the '589 patent is April 19, 2006. ('589 patent.)

[FF183] The '589 patent is assigned to Nichia Corporation. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 38.)

[FF184] The '589 patent states that "an object of the present invention is to provide a semiconductor device wherein the adhesive components do not overflow nor leak to the wire bonding area even when . . . adhesive components having low surface tension [are] used in the

adhesive layer for die bonding, and the overflow and leak preventing function can be maintained satisfactorily even when the device is made smaller and thinner.” (’589 patent, col. 2, ll. 60-67.)

[FF185] The ’589 patent is directed to a device “capable of preventing an adhesive for die bonding from flowing to wire bonding areas.” *See* (’589 patent, Abstract, col. 2, ll. 60-67.) This “bleeding prevention” patent prevents bleeding “by a unique structure that greatly improves the structural integrity and also allows one to make these devices very small.” (5/11/2015 AM Trial Tr., Dkt. No. 165, at 36:22-37:5.)

[FF186] The ’589 patent addresses the problem of preventing an adhesive for die bonding from flowing to wire bonding areas “even when an adhesive consisting of adhesive components having low surface tension is used,” and “even when the device is made smaller and thinner.” *See* (’589 patent, col. 2, ll. 60-67.)

[FF187] According to the ’589 patent, the problem of adhesive flowing from die-bonding areas to wire-bonding areas is not solved adequately by providing a wall on the surface of the lead electrode because: (i) in a small device, the portion of the mold that forms the wall may not fill adequately with resin to form the wall properly, and (ii) weak adhesion between the wall and the electrode may result in leakage of adhesive under the wall. *See* (’589 patent, col. 2, ll. 36-56.)

[FF188] The ’589 patent addresses the problem of adhesive flow by means of an LED package in which the housing has at least one wall formed to extend across the bottom surface of the housing recess so as to divide the first lead electrode into a die bonding area and a wire bonding area; the first lead electrode has a cut-out portion which is formed by cutting off a portion of the edge of the lead electrode at least just below the wall; and the wall and the bottom of the housing are attached to each other through the cut-out portion. *See* (’589 patent, col. 3, ll.

11-18, Abstract (“[T]he first lead electrode 18 has the notch 36 formed by cutting off a portion of the first lead electrode 18 and located at least just below the wall 26, while the wall 26 and the bottom portion 40 of the housing 12 are connected to each other through the notch 36.”)); *see also* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 37:18-38:14.)

[FF189] The ’589 patent discloses that, “[a]ccording to the present invention, the cut-out portion may have a form of a notch formed by cutting off a portion of the edge of the first lead electrode, or a form of through hole formed in the first lead electrode.” (’589 patent, col. 3, ll. 39-42; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 37:23-38:11.) One embodiment of the claimed device is illustrated in Fig. 9(C). (’589 patent, Fig. 9(C); 5/11/2015 AM Trial Tr., Dkt. No. 165, at 37:6-15.)

B. Asserted Claims of the ’589 patent

[FF190] Claims 1 and 2 of the ’589 patent are being asserted in this case, and are reproduced below.

Claim 1	Claim Language
Preamble	A semiconductor device comprising:
[a]	a semiconductor element having a pair of electrodes;
[b]	a housing having a recess for accommodating the semiconductor element;
[c]	a first lead electrode and a second lead electrode exposed on the bottom surface of said recess;
[d]	an adhesive layer for die bonding between the semiconductor element and the first lead electrode; and
[e]	electrically conductive wires for wire bonding between one electrode of the pair of electrodes of the semiconductor element and the first lead electrode and between the other electrode and the second lead electrode,
[f]	wherein the housing has at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding

Claim 1	Claim Language
	area and a wire bonding area;
[g]	the first lead electrode has a notch which is formed by cutting off a portion of an edge of the first lead electrode and located at least just below the wall; and
[h]	the wall and the bottom portion of said housing are connected to each other through the notch.

Claim 2	Claim Language
Preamble	A semiconductor device comprising:
[a]	a semiconductor element having a pair of electrodes;
[b]	a housing having a recess for accommodating the semiconductor element;
[c]	a first lead electrode and a second lead electrode exposed on the bottom surface of the recess;
[d]	an adhesive layer for die bonding between the semiconductor element and the first lead electrode; and
[e]	electrically conductive wires for wire bonding between one electrode of the pair of electrodes of the semiconductor element and the first lead electrode and between the other electrode and the second lead electrode,
[f]	wherein the housing has at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area;
[g]	the first lead electrode has a through hole located at least just below the wall; and
[h]	the wall and the bottom portion of the housing are connected to each other through the through hole.

C. Products Accused of Infringing the '589 patent

[FF191] The products accused of infringing the '589 patent (the "'589 Accused Products'") include: (1) the 61-238 series products; (2) the 67-11 series products; (3) the 67-21 series products; and (4) lamps, luminaires, fixtures and other products incorporating those

products. The results of the infringement analysis for each representative product below extends to the other '589 Accused Products within the same product series. (Dkt. No. 158.)

[FF192] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States, the '589 Accused Products. *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 60:13-19; Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), Nos. 39-42; PTX1211 (Everlight Americas Sales Data of Accused Products), PTX1213 (Everlight Sales Data of Accused Products showing importation and sale of each of the representative products), PTX1221 (Updated Everlight Americas Sales Data of Accused Products).)

D. Construction of the '589 patent Claim Terms

- i. "wall formed to extend across the bottom surface of the recess"

[FF193] This term was construed as "a protruding structure that extends across the bottom surface of the recess." (Claim Construction Order, at 21.)

- ii. "notch which is formed by cutting off a portion of an edge of the first lead electrode"

[FF194] This term was construed as "a cut-out portion in an edge of the first lead electrode which is formed by cutting." (Claim Construction Order, at 26.)

E. Alleged Infringement of the Asserted Claims of the '589 patent

[FF195] As set forth in detail below, the accused 61-238 series products include every element of claim 1 of the '589 patent, and the accused 67-11 and 67-21 series products include every element of claim 2 of the '589 patent.

[FF196] The 67-11 and 67-21 series products have the same lead frame, as well as package design, as relevant to the asserted claims of the '589 patent and, thus, are addressed together for purposes of infringement. *See* (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 46.)

i. The 61-238 Series Products Literally Infringe Claim 1 of the '589 patent

[FF197] The Court finds that all of the claim limitations of Claim 1 of the '589 patent exist in and are met by the accused 61-238 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A semiconductor device comprising:

[FF198] The parties agree that the 61-238 series products are semiconductor devices. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 43 (“The accused 61-238 series products are semiconductor devices, with at least one light-emitting semiconductor chip in the recess.”).)

1[a] a semiconductor element having a pair of electrodes

[FF199] The parties agree that the 61-238 series products include a semiconductor element having a pair of electrodes (claim element 1[a]). (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 43 (“The accused 61-238 series products are semiconductor devices, with at least one light-emitting semiconductor chip in the recess.”), No. 44 (“The accused 61-238 series products include a semiconductor element having a pair of electrodes.”).)

1[b] a housing having a recess for accommodating the semiconductor element;

[FF200] The parties agree that the 61-238 series products include a housing having a recess for accommodating the semiconductor element (claim element 1[b]). (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 45 (“The accused 61-238 series products include a housing having a recess for accommodating the semiconductor element.”).)

1[c] a first lead electrode and a second lead electrode exposed on the bottom surface of said recess;

[FF201] The accused 61-238 series products include a first lead electrode and a second lead electrode exposed on the bottom surface of the recess (claim element 1[c]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 73:12-76:6.)

[FF202] The accused 61-238 series products include three pairs of first and second lead electrodes, each exposed on the bottom surface of the recess. *See, e.g.*, (PTX503; PTX085.)

1[d] an adhesive layer for die bonding between the semiconductor element and the first lead electrode; and

[FF203] The accused 61-238 series products include an adhesive layer for die bonding between the semiconductor element and the first lead electrode (claim element 1[d]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 76:7-77:11; PTX542); *see also* (PTX086; PTX0119.)

1[e] electrically conductive wires for wire bonding between one electrode of the pair of electrodes of the semiconductor element and the first lead electrode and between the other electrode and the second lead electrode

[FF204] The accused 61-238 series products include electrically conductive wires for wire bonding between one electrode of the pair of electrodes of the semiconductor element and the first lead electrode and between the other electrode and the second lead electrode (claim element 1[e]). *See* (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 44, No. 54, No. 55, No. 56); *see also* (PTX542; PTX503.)

1[f] wherein the housing has at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area;

[FF205] The accused 61-238 series products include a housing with at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area (claim element 1[f]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 77:12-78:9.) The 61-238 series products include a wall that “divides the surface of the first lead electrode into a die bonding area and a wire bonding area,” as required by claim 1. *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 77:12-78:9.)

[FF206] The accused 61-238 series products include a housing that has a protruding structure that extends across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area. By extending across the bottom surface of the recess in this manner, the wall divides the surface of the first lead electrode into a die bonding area (for attaching the semiconductor element to the first lead electrode) and a wire bonding area (for attaching the electrically conductive wire to the first lead electrode). (PTX503.)

1[g] the first lead electrode has a notch which is formed by cutting off a portion of an edge of the first lead electrode and located at least just below the wall; and

[FF207] For the accused 61-238 series products, the first lead electrode has a notch which is formed by cutting off a portion of an edge of the first lead electrode and located at least just below the wall (claim element 1[g]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 78:10-80:12.)

[FF208] The accused 61-238 series products have a cut-out portion in an edge of the first lead electrode which is formed by cutting, and the cut-out portion(s) in the edge(s) of the first lead electrode(s) are located below the wall. (5/11/2015 AM Trial Tr., Dkt. No. 165, at 78:10-80:12.) Thus, the accused 61-238 series products include a first lead electrode having a notch that is formed by cutting off a portion of an edge of the first lead electrode and located at least just below the wall. The claimed notch is visible in the optical and x-ray images of the IAL/TAEUS Reports. (PTX503; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 78:17-25.) The notch is co-located with the wall. (PTX503 at 7-9; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 78:17-79:2.)

[FF209] The notch is formed by cutting (*i.e.*, punching) at the time the lead frame is fabricated. *See* (5/12/2015 AM Trial Tr., Dkt. No. 167, at 131:1-132:12; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 79:13-80:9.)

1[h] the wall and the bottom portion of said housing are connected to each other through the notch.

[FF210] The accused 61-238 series products are configured such that the wall and the bottom portion of the housing are connected to each other through the notch (claim element 1[h]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 80:13-25; PTX503.)

- ii. The 67-11 and 67-21 Series Products Literally Infringe Claim 2 of the '589 patent

[FF211] The Court finds that all of the claim limitations of Claim 2 of the '589 patent exist in and are met by the accused 67-11 and 67-21 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A semiconductor device comprising:

[FF212] The parties agree that the 67-11 and 67-21 series products are semiconductor devices. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 47.)

2[a] a semiconductor element having a pair of electrodes;

[FF213] The parties agree that the 61-238 series products include a semiconductor element having a pair of electrodes (claim element 2[a]). (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 48.)

2[b] a housing having a recess for accommodating the semiconductor element;

[FF214] The accused 67-11 and 67-21 series products include a housing having a recess for accommodating the semiconductor element (claim element 2[b]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 81:20-82:11.) The housing is the white resin material that provides the overall shape and structure of the accused 67-11 and 67-21 series products and is visible in

the cross-sectional images of the devices. *See* (PTX501; PTX498; PTX072; PTX075; PTX076; PTX077; PTX080.)

2[c] a first lead electrode and a second lead electrode exposed on the bottom surface of the recess;

[FF215] The accused 67-11 and 67-21 series products include a first lead electrode and a second lead electrode exposed on the bottom surface of the recess (claim element 2[c]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 82:12-83:24.)

[FF216] The accused 67-11 and 67-21 series products include a pair of electrodes – a first lead electrode and a second lead electrode – exposed on the bottom surface of the recess. *See, e.g.*, (PTX501; PTX498.)

2[d] an adhesive layer for die bonding between the semiconductor element and the first lead electrode; and

[FF217] The accused 67-11 and 67-21 series products include an adhesive layer for die bonding between the semiconductor element and the first lead electrode (claim element 2[d]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 83:25-84:25; PTX541; PTX540.)

2[e] electrically conductive wires for wire bonding between one electrode of the pair of electrodes of the semiconductor element and the first lead electrode and between the other electrode and the second lead electrode,

[FF218] The accused 67-11 and 67-21 series products include electrically conductive wires for wire bonding between one electrode of the pair of electrodes of the semiconductor element and the first lead electrode and between the other electrode and the second lead electrode (claim element 2[e]). *See* (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 48 (“The accused 67-11 and 67-21 series products include a semiconductor element having a pair of electrodes.”), No. 59 (“To perform the function of electrically connecting the light emitting element to the positive and negative lead electrodes, the accused 67-11 and 67-21 products use a

pair of wire bonded conductive wires to electrically connect the light emitting element to the positive and negative lead electrodes.”), No. 60 (“In the accused 67-11 and 67-21 series products, one wire is attached at one end to the light emitting element and at the other end to the positive lead electrode; the other wire is attached to the opposite side of the light emitting element and to the negative lead electrode.”); *see also* (PTX541; PTX501; PTX540; PTX498.)

2[f] wherein the housing has at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area;

[FF219] The accused 67-11 and 67-21 series products include a housing with at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area (claim element 2[f]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 73:12-76:6; 85:1-86:9.)

[FF220] The accused 67-11 and 67-21 series products include a housing that has a protruding structure that extends across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area. By extending across the bottom surface of the recess in this manner, the wall divides the surface of the first lead electrode into a die bonding area (for attaching the semiconductor element to the first lead electrode) and a wire bonding area (for attaching the electrically conductive wire to the first lead electrode). *See* (PTX501; PTX498; PTX077.)

2[g] the first lead electrode has a through hole located at least just below the wall; and

[FF221] The accused 67-11 and 67-21 series products include a first lead electrode having a through hole located at least just below the wall (claim element 2[g]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 86:10-87:17.)

[FF222] The claimed through hole, and its location just below the wall, are visible in the optical and x-ray images of the IAL/TAEUS Reports. *See* (PTX501; PTX498; PTX077.)

2[h] the wall and the bottom portion of the housing are connected to each other through the through hole.

[FF223] The accused 67-11 and 67-21 series products are configured such that the wall and the bottom portion of the housing are connected to each other through the through hole (claim element 2[h]). *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 87:18-88:15); *see also* (PTX501; PTX498.)

F. The Prior Art Directed Toward the ‘589 patent

[FF224] The Court finds that the ‘589 patent would not have been obvious to a person of ordinary skill in the art in view of U.S. Patent Application Publication 2004/0256706 (“Nakashima”) (DTX347), and U.S. Patent Application Publication 2006/0170083 (“Kim”) (DTX372). The reasoning and further factual findings underpinning such are discussed in further detail below.

[FF225] The ‘589 patent is directed to the problems that result from the “bleeding” of an adhesive material between a wire bonding area and a die bonding area; specifically, the patent states that “an object of the present invention is to provide a semiconductor device wherein the adhesive components do not overflow nor leak to the wire bonding area even when . . . adhesive components having low surface tension [are] used in the adhesive layer for die bonding, and the overflow and leak preventing function can be maintained satisfactorily even when the device is made smaller and thinner.” (‘589 patent, col. 2, ll. 60-67.)

[FF226] The ‘589 patent further states that it is directed to a device “capable of preventing an adhesive for die bonding from flowing to wire bonding areas.” (‘589 patent, Abstract, col. 2, ll. 60-67.) The ‘589 patent addresses the problem of preventing an adhesive for

die bonding from flowing to wire bonding areas “even when an adhesive consisting of adhesive components having low surface tension is used,” and “even when the device is made smaller and thinner.” *See* (’589 patent, col. 2, ll. 60-67.)

[FF227] The ’589 patent refers to and distinguishes prior art references directed “to prevent[ing] the bleeding phenomenon by providing a protrusion between the lead electrodes.” *See* (’589 patent, col. 1, ll. 34-38.) Likewise, the ’589 patent refers to and distinguishes prior art references that disclose a device that has a lead electrode in which “a first bonding region where die bonding is carried out and a second bonding region where wire bonding is carried out are separated from each other by a wall.” *See* (’589 patent, col. 1, ll. 39-49.)

[FF228] According to the ’589 patent, the problem of adhesive flowing from die bonding areas to wire-bonding areas is not solved adequately merely by providing a wall on the surface of the lead electrode, as disclosed in the prior art, because: (i) in a small device, the portion of the mold that forms the wall may not fill adequately with resin to form the wall properly, and (ii) weak adhesion between the wall and the lead electrode may result in leakage of adhesive under the wall. *See* (’589 patent, col. 2, ll. 36-56.)

[FF229] The ’589 patent addresses the bleeding problem by means of an LED package that includes three elements: (i) the housing has at least one wall formed to extend across the bottom surface of the housing recess so as to divide the first lead electrode into a die-bonding area and a wire-bonding area; (ii) the first lead electrode has a cut-out portion that is formed by cutting off a portion of the edge of the lead electrode at least just below the wall; and (iii) the wall and the bottom of the housing are attached to each other through the cut-out portion. *See* (’589 patent, col. 3, ll. 11-18); *see also* (’589 patent, Abstract.) The ’589 patent further discloses that the cut-out portion (notch) may be substituted with a through hole formed in the first lead

electrode: “According to the present invention, the cutout portion may have a form of a notch formed by cutting off a portion of the edge of the first lead electrode, or a form of through hole formed in the first lead electrode.” (’589 patent, col. 3, ll. 39-42.)

[FF230] No single reference, including Nakashima and Kim, discloses all of the elements of claims 1 and 2 of the ’589 patent. (5/13/2015 AM Trial Tr., Dkt. No. 170, at 110:10-14.)

[FF231] Both Nakashima and Kim were known to the examiner who allowed the asserted claims of the ’589 patent. *See* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 111:17-23, 113:2-7); *see also* (’589 patent, cover.)

i. The Nakashima and Kim References on Which Defendants Rely Fail to Disclose Numerous Elements of the Asserted Claims

[FF232] Neither Nakashima nor Kim includes the combination of elements set forth in the ’589 patent. *See, e.g.*, (5/13/2015 AM Trial Tr., Dkt. No. 170, at 110:10-14.)

1. Nakashima, Which Was Before the PTO During Prosecution of the ’589 patent, Does Not Disclose or Suggest a Wall Formed to Extend Across the Bottom Surface of the Recess with a Notch or Through-Hole Under the Wall

[FF233] U.S. Patent Application Publication 2004/0256706 (“Nakashima”) was published on December 23, 2004. (Nakashima, cover.)

[FF234] Nakashima issued as U.S. Patent No. 7,045,905, which was presented to the U.S. Patent and Trademark Office during prosecution of the ’589 patent. *See* (’589 patent, cover; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 111:17-23, 113:2-7.)

[FF235] Nakashima is directed to a molded package for an LED device that reduces the likelihood of delamination – that is, detachment of the encapsulating resin from the package. *See* (Nakashima, ¶ [0005], [0065].)

[FF236] The delamination issue addressed in Nakashima arises from differing thermal expansion coefficients for the encapsulating resin compared to that of metal lead electrodes in contact with the encapsulating resin. *See* (Nakashima, ¶ [0005].) This cracking can lead to detachment of the LED device's wires and affect the device's performance and reliability. (*Id.*)

[FF237] Nakashima discloses a device that has a circular recess and three exposed metal members. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 84:4-6; Nakashima, Abstract, ¶ [0047].) In addition, "A portion of each main surface can be also divided into at least two bonding regions by a wall portion comprising part of the mold member." (Nakashima, Abstract.)

[FF238] In Nakashima, metal members 102 and 103 are the lead electrodes. Nakashima, ¶ [0052] .) The light emitting element 108 is mounted on metal member 101, which acts as a thermal electrode (heat sink), but is not a lead electrode. (5/13/2015 AM Trial Tr., Dkt. No. 170, at 84:5-8; Nakashima, ¶ [0051] .)

[FF239] Nakashima further discloses a wall portion 104 in the recess of the package. (Nakashima, ¶ [0008], [0053], [0069].) The wall portion 104 "is of the same mold member as the molded package 100." (Nakashima.) The wall portion is formed on the main surface of the second metal member 102 and the third metal member 103 (the two lead electrodes) "so as to extend in a direction from a part of the inner surface 106a[.]" (Nakashima, ¶¶ [0053], [0070].) The wall portion 104 also "covers the main surfaces of the second metal member 102 and the third metal member 103, except an area necessary for bonding the conductive wires 109 and the protective element 107." (Nakashima, ¶¶ [0058], [0069]-[0070].) By forming the wall continuously with the molded package, "the strength of the wall portion can be enhanced." (Nakashima, ¶ [0012], [0020].)

[FF240] By expanding the area of interface between the encapsulant material and the package resin of the wall portion 104, Nakashima reduces the likelihood of delamination of the encapsulant material. (Nakashima ¶ [0058].)

[FF241] According to Nakashima, the wall portion can divide the surfaces exposed on the bottom of the recess into a die bonding area and a wire bonding area. (Nakashima, Abstract, ¶ [0010].) Nakashima explains that this aspect of the wall portion has two advantages: “[T]he exposed areas of the second member and the third member can be widened and the workability in semiconductor device production can be improved. Also, the strength of the wall portion can be enhanced.” (Nakashima, ¶ [0011].) Likewise, “[w]ith this construction, the stress generated by the encapsulating member is concentrated in the direction of the wall portion. Therefore, the conductive wires can be prevented from detached [sic] from the lead electrode and the semiconductor device with high reliability can be obtained.” (Nakashima, ¶ [0026].)

[FF242] Nakashima also discloses: “The wall portion is preferably formed continuously with the molded member. As a result, the strength of the wall portion can be enhanced.” (Nakashima, ¶ [0012].)

[FF243] Nakashima further discloses a device that includes a “protective element 107” that is mounted on lead electrode 103 and is electrically connected to lead electrode 102 via a single wire. *See* (Nakashima, ¶ Fig. 2, ¶ [0022].)

[FF244] Nakashima does not refer to a “notch” or a “through hole” anywhere in the reference. Nakashima uses the word “hole” to refer to elements 114 and 115, which are holes in the bottom portion of the package housing that expose the lead electrodes on the bottom of the device; these holes do not have any relationship to a wall that divides a lead electrode into different bonding areas. *See, e.g.*, (Nakashima, ¶ [0246], ¶¶ [0067]–[0079], ¶¶ [0080]–[0087].)

[FF245] Nakashima further does not disclose or suggest the following elements of the asserted claims of the '589 patent:

- “wherein the housing has at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area;” (Claim Element 1[f]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 81:20-23);
- “the first lead electrode has a notch which is formed by cutting off a portion of an edge of the first lead electrode and located at least just below the wall;” (Claim Element 1[g]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 81:24-25);
- “the wall and the bottom portion of said housing are connected to each other through the notch.” (Claim Element 1[h]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 82:1-3);
- “wherein the housing has at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area;” (Claim Element 2[f]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 81:20-23); and
- “the first lead electrode has a through hole located at least just below the wall;” (Claim Element 2[g]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 82:8-11); and
- “the wall and the bottom portion of the housing are connected to each other through the through hole.” (Claim Element 2[h]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 82:8-11).

2. Kim, Which Also Was Before the PTO During Prosecution of the '589 patent, Does Not Disclose or Suggest a Wall Formed to Extend Across the Bottom Surface of the Recess with a Notch or Through-Hole Under the Wall

[FF246] U.S. Patent Application Publication 2006/0170083 (“Kim”) is entitled “Side View LED Package Having Lead Frame Structure Designed to Improve Resin Flow.” Kim has a priority date of January 28, 2005. (Kim, cover.)

[FF247] Kim was considered by the United States Patent and Trademark Office during prosecution of the '589 patent. *See* ('589 patent, cover; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 110:17-23, 111:17-23, 113:2-7.)

[FF248] Kim is directed to a “side view LED package in use with an LCD backlight unit.” *See* (Kim, Abstract and ¶ [0003]; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 81:1-5.) Kim is a side-view LED. (5/13/2015 AM Trial Tr., Dkt. No. 170, at 81:1-3, 87:8-10.)

[FF249] Kim addresses the problem of resin flow into the thin side wall of the package’s recess. Specifically, Kim discloses a means of enhancing the flow of resin into the side wall of a side-view LED package. *See* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 81:1-8; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:18-84:11.)

[FF250] Kim explains that the demand for smaller, thinner side-view LEDs resulted in packages in which dimensions of 0.5 mm or less will be required. (Kim, ¶ [0005].) Kim further explains that, to achieve these dimensions, “endeavors have been made to reduce the thickness of the upper and lower wall parts around an LED window. However, reducing the wall part thickness is an extremely difficult task. This task also potentially weakens wall strength thereby failing to ensure reliability.” (Kim, ¶ [0006]); *see also* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:25-84:3.)

[FF251] According to Kim, in prior art LED package designs, “the lead frames 40 are placed along substantially the entire length of the LED package 10, with a width larger than the bottom 16 of the cavity C.” Molding resin for LED packages therefore flowed through a “small gap 20,” which acted “as a bottleneck,” such that the resin did not flow smoothly when forming the “direction of arrow B” – that is, into the wall surrounding the recess in the package housing. *See* (Kim, ¶ [0009]; Fig. 4.)

[FF252] To address this problem, Kim discloses a “side view LED package having a lead frame structure designed to improve resin flow in order to ensure stability even if the LED

package is made extremely thin.” *See* (Kim, ¶ [0003]; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 81:1-7.)

[FF253] Kim further discloses that the side view LED package includes an LED chip and a “strip-shaped lead frame having a toothed structure formed in a lateral edge thereof,” with “the LED chip mounted on a surface of the lead frame and an integral package body made of resin, and including a hollow front half having a cavity for housing the LED chip and a solid rear half divided from the front half by the lead frame.” (Kim, ¶ [0017].)

[FF254] According to Kim, the toothed structure forms a resin flow passage that promotes the flow of molding resin into a side wall surrounding the recess in the LED package. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:20-24; Kim, ¶ [0018].) These passages, or “resin flowing grooves” 146, 148 are described as having a “toothed configuration.” (Kim, ¶¶ [0021]-[0023], [0039], [0064], Fig 7 (element 146).) According to Kim, the grooves 146, 148 allow for a better flow of the molding resin from the rear of the package’s housing 102*b* into the upper portions of the package’s housing 102*a*. (Kim, ¶¶ [0056]-[0060].)

[FF255] Kim does not disclose a wall across the bottom surface of a recess in the housing of the LED package. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 82:18-21); *see, e.g.*, (Kim, Fig. 7.)

[FF256] The grooves disclosed in Kim are situated underneath the outer walls of the package’s housing, not under a wall that extends across the bottom surface of the recess. . *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:20-24.)

[FF257] Kim does not disclose or suggest the following elements of the asserted claims of the ’589 patent:

- “wherein the housing has at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding

area and a wire bonding area;” (Claim Element 1[f]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 82:18-21);

- “the first lead electrode has a notch which is formed by cutting off a portion of an edge of the first lead electrode and located at least just below the wall;” (Claim Element 1[g]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 82:22-23);
- “the wall and the bottom portion of said housing are connected to each other through the notch.” (Claim Element 1[h]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 82:24-83:1);
- “wherein the housing has at least one wall formed to extend across the bottom surface of the recess so as to divide the surface of the first lead electrode into a die bonding area and a wire bonding area” (Claim Element 2[f]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 82:18-21);
- “the first lead electrode has a through hole located at least just below the wall;” (Claim Element 2[g]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:2-6); and
- “the wall and the bottom portion of the housing are connected to each other through the through hole.” (Claim Element 2[h]), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:2-6).

ii. The Asserted Claims of the ’589 patent Would Not Have Been Obvious to One of Ordinary Skill in the Art in View of Nakashima and Kim

[FF258] Neither Nakashima nor Kim discloses a package that includes the combination of elements disclosed in the asserted claims of the ’589 patent. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 80:21-81:5.)

[FF259] The devices claimed in the asserted claims of the ’589 patent would not have been obvious to one of ordinary skill in the art in view of Nakashima and Kim. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 80:17-84:14.)

1. A Person of Ordinary Skill in the Art Would Not Have Been Motivated to Combine Features from the Nakashima and Kim References

[FF260] Neither Kim nor Nakashima includes a suggestion or teaching that would lead one of ordinary skill in the art to combine the two references. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:17-19, 84:7-11.)

[FF261] Nakashima and Kim are not directed to similar packages. The Nakashima and Kim references also describe different structures. Kim relates to thin, side-view LEDs, while Nakashima relates to a top-view LED with a recess that includes three metal members partially covered by a wall portion. *Compare* (Kim, Abstract (“The invention relates to a side view LED package in use with an LEC backlight unit”) *with* (Nakashima, Abstract, ¶ [0008]); *see also* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 80:13-18, 81:1-8; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:25-84:5.)

[FF262] The prior art references address different problems in packaging structures and disclose different solutions. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 83:25-84:6. Kim is directed to enhancement of resin flow into the wall surrounding the recess in the housing of the package.) Kim contemplates that the structure that promotes resin flow will be embedded in the body of the package itself. (Kim, [0021].) Nakashima, however, is not directed to a structure with resin flow issues. (5/13/2015 PM Trial Tr., Dkt.No. 171, at 84:4-6); *see, e.g.*, (Nakashima, ¶ [0069]). Rather, Nakashima is concerned about delamination of the encapsulant material as a result of different coefficients of thermal expansion among the different package materials. (Nakashima, ¶¶ [0005], ¶ [0006].)

2. The Prior Art References Do Not Disclose All of the Elements of the Asserted Claims

[FF263] Nakashima does not disclose the claim limitation, “an adhesive layer for die bonding between the semiconductor element and the first lead electrode.” *See, e.g.*, (5/13/2015 AM Trial Tr., Dkt. No. 170, at 83:24-84:8 (claiming Nakashima discloses this element even though Nakashima is bonded to a thermal lead, not a lead electrode).)

[FF264] Therefore, the combination of Nakashima and Kim does not include all of the elements of the asserted claims of the ’589 patent.

VII. U.S. Patent No. 7,462,870

A. Summary of the ’870 patent

[FF265] The ’870 patent is entitled “Molded Package and Semiconductor Device Using Molded Package,” and issued on December 9, 2008. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 49.)

[FF266] The ’870 patent lists Shintaro Nakashima as the named inventor. (Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), No. 50.)

[FF267] The earliest priority date for the asserted claims of the ’870 patent is June 20, 2003. (’870 patent.)

[FF268] The ’870 patent is assigned to Nichia Corporation. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 51.)

[FF269] The ’870 patent is directed to problems that arise in LED devices because the materials used in the device have different rates of thermal expansion. *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 38:20-39:3.) As components expand and contract at different rates during thermal cycling, the components may crack or break away from each other, impairing the device’s operation and reliability. *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 38:20-39:3.)

[FF270] According to the '870 patent, the problem associated with different rates of thermal expansion is particularly acute at the interface between the device's metal components and the encapsulating resin:

[T]he thermal expansion coefficients of the metal member exposed in the recess of the molded package and the resin which encloses the recess are different, and so problems such as cracking at their interface occur. Such cracking may result in the resin falling out of from the molded package. Also, a gap created by the cracking adversely affects the optical properties of the light emitting device. Further, when the thermal stress exerted from the resin concentrates on the bonding portion of the conductive wires, the portion may detach from the surface of the lead electrode. This causes disconnection of the semiconductor element from the external electrode.

('870 patent, col. 1, ll. 38-49.)

[FF271] The '870 patent states that “an object of the present invention is to solve the problems described above and provide a semiconductor device having a high reliability.” ('870 patent, col. 1, ll. 54-56.) The claimed LED device has “a specific feature, a wall portion, and this wall portion improves structural integrity, particularly if the device is subject to temperature variations so that package cracking, detachment of the encapsulation material, and warping of the package is reduced or avoided.” (5/11/2015 AM Trial Tr., Dkt. No. 165, at 38:20-39:3.)

[FF272] The '870 patent discloses an embodiment in which a wall portion 104 covers the main surfaces of the second metal member 102 and the third metal member 103 except for areas that remain exposed for purposes of bonding. *See* ('870 patent, col. 7, ll. 46-49.) By this design, “[t]he wall portion 104 increases the contact area of the encapsulating member and the mold member, which have relatively high adhesion [with] each other.” ('870 patent, col. 7, ll. 55-58.)

[FF273] By the design disclosed in the '870 patent, the exposed areas of the metal members in the recess of the package are reduced compared with the art. This has two beneficial

effects: it concentrates stress on the package’s side wall rather than on the delicate wires, and it makes detachment of the encapsulating material more difficult. *See* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 39:18–40:10; ’870 patent, col. 7, ll. 49-53; col. 8, ll. 55-60; col. 9, ll. 17-37.)

[FF274] Additionally, the ’870 patent specifies that “at least one of the second member and the third member is divided into at least two portions by a wall portion.” (’870 patent, col. 2, ll. 8-9.) Otherwise, “[t]he shape of the wall portion 104 is not specifically limited, and any shapes may be used, provided that the wall portion exposes at least two bonding regions on the main surface.” (’870 patent, col. 9, ll. 20-34.)

[FF275] The ’870 patent states that “the wall portion which is formed to separate the bonding regions prevents an adhesive material which is used for die bonding a semiconductor component from flowing into the bonding region of the conductive wires.” (’870 patent, col. 2, ll. 12-15, Fig. 5); *see* (5/11/2015 AM Trial Tr., Dkt. No. 165, at 39:4-10.)

B. Asserted Claims of the ’870 patent

[FF276] Claims 2, 3, 9, 10, and 11 are being asserted in this case.

[FF277] Claims 2 and 3, and claim 1 from which claims 2 and 3 depend, are reproduced below:

Claim 1	
Preamble	A molded package for a light emitting device comprising:
[a]	a molded member having a recess formed therein with a bottom surface and a side surface;
[b]	a positive lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;
[c]	a negative lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;
[d]	wherein a portion of said positive lead electrode and a portion of said negative lead

Claim 1	
	electrode in the recess are separated from each other by a wall portion,
[e]	wherein said wall portion extends inwardly in a direction toward a center of the recess.

Claim 2	
The molded package according to claim 1, wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion.	

Claim 3	
The molded package according to claim 2, wherein said wall portion is integral with said molded member.	

[FF278] Claims 9, 10, and 11, and claim 7, from which claims 9, 10, and 11 depend, are reproduced below:

Claim 7	
Preamble	A light emitting device comprising:
[a]	a light emitting element;
[b]	a molded member having a recess formed therein by a bottom surface and a side surface so as to mount said light emitting element in substantially a center of the recess;
[c]	a positive lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;
[d]	a negative lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;
[e]	means for electrically connecting said light emitting element to said positive lead electrode, and said light emitting element to said negative lead electrode;
[f]	wherein a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other by a wall portion,

Claim 7	
[g]	wherein said wall portion extends inwardly in a direction toward the center of the recess.

Claim 9	
The light emitting device according to claim 7, further comprising a protective element mounted on at least one of said positive lead electrode and said negative lead electrode so as to protect said light emitting element from overvoltage.	

Claim 10	
The light emitting device according to claim 7, wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion.	

Claim 11	
The light emitting device according to claim 10, wherein said wall portion is integral with said molded member.	

C. Products Accused of Infringing the '870 patent

[FF279] The products accused of infringing the '870 patent (the "'870 Accused Products'") include: (1) the 61-238 series products; (2) the 67-11 series products; (3) the 67-21 series products; (4) the 62-217B series products; (5) the 62-227B series products; (6) the EHP-A09K series products; and (7) lamps, luminaires, fixtures and other products incorporating those products. The results of the infringement analysis for each representative product below extends to the other '870 Accused Products within the same product series. (Dkt. No. 158.)

[FF280] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States, the '870 Accused Products. (5/11/2015 PM Trial Tr.,

Dkt. No. 166, at 60:13-19; Stipulated Findings of Fact (Dkt. No. 132, Ex. 2), Nos. 39-42; PTX1211; PTX1213; PTX1221; DTX415.)

D. Claim Construction

i. “adjacent to the side surface in the recess”

[FF281] “Adjacent to the side surface in the recess” means “lying near or adjoined to the side surface in the recess.” *See* (Claim Construction Order, at 28.)

ii. “wall portion”

[FF282] This term is properly construed as “portion of the molded package/molded member/device that covers at least a portion of a surface of the lead electrodes.” *See* (Claim Construction Order, at 32.)

iii. “extends inwardly in a direction toward a [the] center of the recess”

[FF283] “Extends inwardly in a direction toward a [the] center of the recess” means “extends from the side surface of the recess toward a [the] center of the recess.” *See* (Claim Construction Order, at 37-38.)

iv. “means for electrically connecting said light emitting element to said positive lead electrode, and said light emitting element to said negative lead electrode”

[FF284] This term was construed as a means-plus-function limitation, in which the function is “electrically connecting said light emitting element to said positive lead electrode...[and] to said negative lead electrode,” and the corresponding structure was either of two embodiments: (1) “wire bonded conductive wires 109 and equivalents thereof,” and/or (2) “submount 301 with bumps, wire bonded conductive wires 109, and the equivalents thereof.” *See* (Claim Construction Order, at 42.)

E. Alleged Infringement of the Asserted Claims of the '870 patent

[FF285] The 67-11 and 67-21 series products have the same lead frame, as well as package design, as relevant to the asserted claims of the '870 patent and, thus, are addressed together for purposes of infringement. *See* (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 46.)

[FF286] The 62-217B and 62-227B series products have the same lead frame, as well as package design, as relevant to the asserted claims of the '870 patent and, thus, are addressed together for purposes of infringement. *See* (5/12/2015 AM Trial Tr., Dkt. No. 167, at 133:18-134:5; 5/11/2015 AM Trial Tr., Dkt. No. 165, at 46:19-47:1.)

- i. The 61-238 Series Products Literally Infringe the Asserted Claims of the '870 patent

Claim 1

[FF287] The Court finds that all of the claim limitations of Claim 1 of the '870 patent exist in and are met by the accused 61-238 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A molded package for a light emitting device comprising:

[FF288] The 61-238 series products include a molded package for a light emitting device. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 52 (“The accused 61-238 series products have molded packages for a light emitting device.”).)

1[a] a molded member having a recess formed therein with a bottom surface and a side surface;

[FF289] The accused 61-238 series products include a molded member having a recess formed therein with a bottom surface and a side surface (claim element 1[a]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 4:13-5:15; PTX503.)

[FF290] The molded member is a white resin material, with a recess having a bottom surface and a side surface. The recess is visible in the optical top view and cross-sectional images of the 61-238 series products. *See* (PTX503; PTX093; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 4:16-22.)

1[b] a positive lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;

1[c] a negative lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;

[FF291] The accused 61-238 series products include a positive and negative lead electrode, each electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member (claim elements 1[b] and 1[c]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 5:16-6:8.)

[FF292] The accused 61-238 series products include both a positive lead electrode and a negative lead electrode, each partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from the molded member. More specifically, the accused 61-238 series products have positive and negative lead electrodes, each partially disposed on the bottom surface in the recess, lying near or adjoined to the side surface in the recess, and extending outwardly from the molded member. *See* (PTX503; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 5:16-6:8.)

1[d] wherein a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other by a wall portion,

[FF293] For the accused 61-238 series products, a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other by a wall portion (claim element 1[d]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 6:11-7:7; PTX503.)

[FF294] The accused 61-238 series products are arranged such that a portion of the positive lead electrode and a portion of the negative lead electrode in the recess are separated from each other by a wall portion. The accused 61-238 series products are arranged such that a portion of the positive lead electrode and a portion of the negative lead electrode in the recess are separated from each other by a portion of the molded package/molded member/device that covers at least a portion of a surface of the lead electrodes. *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 6:11-7:7; PTX503); *see also* ('870 patent, Fig. 5.)

1[e] wherein said wall portion extends inwardly in a direction toward a center of the recess.

[FF295] For the accused 61-238 series products, the wall portion extends inwardly in a direction toward a center of the recess (claim element 1[e]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 7:8-8:7; PTX503.)

[FF296] The accused 61-238 series products are arranged such that the wall portion extends inwardly in a direction toward a center of the recess. That is, the accused 61-238 series products are arranged such that a portion of the molded member that covers at least a portion of a surface of the lead electrodes also extends from the side surface of the recess towards a [the] center of the recess. *See* (PTX503; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 7:8-8:9.)

Claim 2:

[FF297] The Court finds that all of the claim limitations of Claim 2 of the '870 patent exist in and are met by the accused 61-238 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

2[a] The molded package according to claim 1, wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion.

[FF298] The accused 61-238 series products are arranged so that at least one of the positive or negative lead electrodes in each pair of electrodes is divided by the wall portion. *See* (PTX503); *see also* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 10:4-19.)

Claim 3:

[FF299] The Court finds that all of the claim limitations of Claim 3 of the '870 patent exist in and are met by the accused 61-238 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

3[a] The molded package according to claim 2, wherein said wall portion is integral with said molded member.

[FF300] The accused 61-238 series products are arranged so that the wall portion (identified in claims 1 and 2) is integral with the molded member. *See* (PTX503); *see also* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 10:4-19.)

Claim 7

[FF301] The Court finds that all of the claim limitations of Claim 7 of the '870 patent exist in and are met by the accused 61-238 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

[FF302] Claims 1 and 7 are very similar. *Compare* ('870 patent at col. 34, ll. 52-67) *with* ('870 patent at col. 35, ll. 21-42); *see also* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 3:1-7.)

The differences are:

- the preamble of claim 7 is a “light emitting device”
- claim 7 expressly recites “a light emitting element”
- claim 7 requires that the light emitting element is “in substantially a center of the recess”
- claim 7 includes “means for electrically connecting said light emitting element to said positive lead electrode, and said light emitting element to said negative lead electrode”

These differences are addressed below for the 61-238 series products.

Preamble: A light emitting device comprising:

[FF303] The “accused 61-238 series products are light emitting devices.” (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 53.)

7[a] a light emitting element;

[FF304] The accused 61-238 series products include a light emitting element (claim element 7[a]). (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 43; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 9:5-9; PTX503).

7[b] ... said light emitting element in substantially a center of the recess;

[FF305] The accused 61-238 series products include a molded member having a recess formed by a bottom surface and a side surface so as to mount a light emitting element in substantially a center of the recess (claim element 7[b]). The light emitting element is mounted in substantially a center of the recess. *See* (PTX503; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 3:1-7; Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 43); *see also* discussion, *supra* at regarding claim element 1[a] of the '870 patent.

7[e] means for electrically connecting said light emitting element to said positive lead electrode, and said light emitting element to said negative lead electrode;

[FF306] The accused 61-238 series products include a means for electrically connecting the light emitting element to the positive lead electrode and the negative lead electrode. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 54.)

[FF307] To perform the function of electrically connecting the light emitting element to the positive and negative lead electrodes, the accused 61-238 series products use a pair of wire bonded conductive wires to electrically connect the light emitting element to the positive and

negative lead electrodes. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 54); *see also* (PTX503).

Claim 10:

[FF308] The Court finds that all of the claim limitations of Claim 10 of the '870 patent exist in and are met by the accused 61-238 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

10[a] The light emitting device according to claim 7, wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion.

[FF309] The accused 61-238 series products meet this limitation, for the same reasons stated above in connection with claim 2. *See* discussion, *supra* at **FF298**.

Claim 11:

[FF310] The Court finds that all of the claim limitations of Claim 11 of the '870 patent exist in and are met by the accused 61-238 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

11[a] The light emitting device according to claim 10, wherein said wall portion is integral with said molded member.

[FF311] The accused 61-238 series products meet this limitation, for the same reasons stated above in connection with claim 3. *See* discussion, *supra* at **FF300**.

- ii. The 67-11 and 67-21 Series Products Literally Infringe the Asserted Claims of the '870 patent

Claim 1

[FF312] The Court finds that all of the claim limitations of Claim 1 of the '870 patent exist in and are met by the accused 67-11 and 67-21 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A molded package for a light emitting device comprising:

[FF313] The parties agree that the 67-11 and 67-21 series products include a molded package for a light emitting device. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 57.)

1[a] a molded member having a recess formed therein with a bottom surface and a side surface;

[FF314] The accused 67-11 and 67-21 series products include a molded member having a recess formed therein with a bottom surface and a side surface (claim element 1[a]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 11:15-12:4; PTX503.)

[FF315] The molded member is a white resin material, with a recess having a bottom surface and a side surface. The recess is visible in the optical top view and cross-sectional images of the 67-11 series products. *See* (PTX501); *see also* (PTX498; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 11:15-12:4; PTX075; PTX076; PTX077.)

1[b] a positive lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;

1[c] a negative lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;

[FF316] The accused 67-11 and 67-21 series products include a positive and negative lead electrode, each electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member (claim elements 1[b] and 1[c]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 12:5-24; PTX501; PTX498.)

[FF317] The accused 67-11 and 67-21 series products include both a positive lead electrode and a negative lead electrode, each partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from the molded member. More specifically, the accused 67-11 and 67-21 series products have positive and negative lead electrodes, each partially disposed on the bottom surface in the recess, lying near or adjoined to

the side surface in the recess, and extending outwardly from the molded member. *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 12:5-24); *see also* (PTX498; PTX501.)

1[d] wherein a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other by a wall portion,

[FF318] For the accused 67-11 and 67-21 series products, a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other by a wall portion (claim element 1[d]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 13:6-20; PTX501; PTX498.)

[FF319] The accused 67-11 and 67-21 series products are arranged such that a portion of the positive lead electrode and a portion of the negative lead electrode in the recess are separated from each other by a wall portion. That is, the accused 67-11 and 67-21 series products are arranged such that a portion of the positive lead electrode and a portion of the negative lead electrode in the recess are separated from each other by a portion of the molded package/molded member/device that covers at least a portion of a surface of the lead electrodes. *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 13:6-20; PTX501; PTX498.)

1[e] wherein said wall portion extends inwardly in a direction toward a center of the recess.

[FF320] For the accused 67-11 and 67-21 series products, the wall portion extends inwardly in a direction toward a center of the recess (claim element 1[e]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 14:15-15:10; PTX501; PTX498.)

[FF321] The accused 67-11 and 67-21 series products are arranged such that the wall portion extends inwardly in a direction toward a center of the recess. The accused 67-11 and 67-21 series products are arranged such that a portion of the molded member that covers at least a portion of a surface of the lead electrodes also extends from the side surface of the recess

towards a [the] center of the recess. *See* (PTX501 at 5; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 14:15-15:10); *see also* (PTX498.)

Claim 2:

[FF322] The Court finds that all of the claim limitations of Claim 2 of the '870 patent exist in and are met by the accused 67-11 and 67-21 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

2[a] The molded package according to claim 1, wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion.

[FF323] The accused 67-11 and 67-21 series products are arranged so that at least one of the positive or negative lead electrodes in each pair of electrodes is divided by the wall portion. *See* (PTX503); *see also* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 16:16-17:17; PTX498.)

Claim 3:

[FF324] The Court finds that all of the claim limitations of Claim 3 of the '870 patent exist in and are met by the accused 67-11 and 67-21 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

3[a] The molded package according to claim 2, wherein said wall portion is integral with said molded member.

[FF325] The accused 67-11 and 67-21 series products are arranged so that the wall portion (identified in claims 1 and 2) is integral with the molded member. *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 16:16-17:17); *see, e.g.*, (PTX503; PTX498.) The wall portion and molded member are formed of the same white resin material.

Claim 7:

[FF326] The Court finds that all of the claim limitations of Claim 7 of the '870 patent exist in and are met by the accused 67-11 and 67-21 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

[FF327] The additional limitations of claim 7 are analyzed below. *See* discussion, *supra* at FF302 regarding differences between claims 1 and 7.

Preamble: A light emitting device comprising:

[FF328] The “accused 67-11 and 67-21 series products are light emitting devices.” (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 53.)

7[a] a light emitting element;

[FF329] The accused 67-11 and 67-21 series products include a light emitting element (claim element 7[a]). *See, e.g.*, (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), Nos. 59, 60; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 16:6-8; PTX501; PTX498.)

7[b] ... said light emitting element in substantially a center of the recess;

[FF330] The accused 67-11 and 67-21 series products include a molded member having a recess formed by a bottom surface and a side surface so as to mount a light emitting element in substantially a center of the recess (claim element 7[b]). The light emitting element is mounted in substantially a center of the recess, as shown below in an exemplary optical image of the 67-11 device. *See* (PTX501; PTX498.)

7[e] means for electrically connecting said light emitting element to said positive lead electrode, and said light emitting element to said negative lead electrode;

[FF331] The accused 67-11 and 67-21 series products include the claimed means for electrically connecting the light emitting element to the positive lead electrode and the negative

lead electrode, as construed by the Court. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 59, No. 60); *see also* (PTX501; PTX498.)

Claim 9:

[FF332] The Court finds that all of the claim limitations of Claim 9 of the '870 patent exist in and are met by the accused 67-11 and 67-21 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

9[a] The light emitting device according to claim 7, further comprising a protective element mounted on at least one of said positive lead electrode and said negative lead electrode so as to protect said light emitting element from overvoltage.

[FF333] The accused 67-11 series products meet this limitation, because each includes a protective element (Zener diode) mounted on the positive (or negative) lead electrode to protect the light emitting element from overvoltage. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 61); *see also* (PTX501.)

Claim 10:

[FF334] The Court finds that all of the claim limitations of Claim 10 of the '870 patent exist in and are met by the accused 67-11 and 67-21 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

10[a] The light emitting device according to claim 7, wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion.

[FF335] The accused 67-11 and 67-21 series products meet this limitation, for the same reasons stated above in connection with claim 2. *See* discussion, *supra* at **FF323**.

Claim 11:

[FF336] The Court finds that all of the claim limitations of Claim 11 of the '870 patent exist in and are met by the accused 67-11 and 67-21 series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

11[a] The light emitting device according to claim 10, wherein said wall portion is integral with said molded member.

[FF337] The accused 67-11 and 67-21 series products meet this limitation, for the same reasons stated above in connection with claim 3. *See* discussion, *supra* at **FF325**.

- iii. The 62-217B and 62-227B Series Products Literally Infringe the Asserted Claims of the '870 patent

Claim 1

[FF338] The Court finds that all of the claim limitations of Claim 1 of the '870 patent exist in and are met by the accused 62-217B and 62-227B series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A molded package for a light emitting device comprising:

[FF339] The parties agree that the 62-217B and 62-227B series products include a molded package for a light emitting device. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 63.)

1[a] a molded member having a recess formed therein with a bottom surface and a side surface;

[FF340] The accused 62-217B and 62-227B series products include a molded member having a recess formed therein with a bottom surface and a side surface (claim element 1[a]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 18:8-24; PTX520; PTX522.)

[FF341] The molded member is a white resin material, with a recess having a bottom surface and a side surface. *See* (PTX520 at 8; PTX522 at 16; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 18:8-24); *see also* (PTX019; 5/12/2015 AM Trial Tr., Dkt. No. 167, at 133:18-134:2.)

1[b] a positive lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;

1[c] a negative lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;

[FF342] The accused 62-217B and 62-227B series products include a positive and negative lead electrode, each electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member (claim elements 1[b] and 1[c]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 19:7-16; PTX520; PTX522.)

[FF343] The accused 62-217B and 62-227B series products include both a positive lead electrode and a negative lead electrode, each partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from the molded member. More specifically, the accused 62-217B and 62-227B series products have positive and negative lead electrodes, each partially disposed on the bottom surface in the recess, lying near or adjoined to the side surface in the recess, and extending outwardly from the molded member. *See* (PTX520; PTX522; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 19:7-16.)

1[d] wherein a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other by a wall portion,

[FF344] For the accused 62-217B and 62-227B series products, a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other by a wall portion (claim element 1[d]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 19:22-20:10; PTX520; PTX522.)

[FF345] The accused 62-217B and 62-227B series products are arranged such that a portion of the positive lead electrode and a portion of the negative lead electrode in the recess are separated from each other by a wall portion. The accused 62-217B and 62-227B series products

are arranged such that a portion of the positive lead electrode and a portion of the negative lead electrode in the recess are separated from each other by a portion of the molded package/molded member/device that covers at least a portion of a surface of the lead electrodes. *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 19:22-20:10; PTX520; PTX522.)

1[e] wherein said wall portion extends inwardly in a direction toward a center of the recess.

[FF346] For the accused 62-217B and 62-227B series products, the wall portion extends inwardly in a direction toward a center of the recess (claim element 1[e]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 20:11-21:13; PTX520; PTX522.)

[FF347] The accused 62-217B and 62-227B series products are arranged such that the wall portion extends inwardly in a direction toward a center of the recess. The accused 62-217B and 62-227B series products, though rectangular, are arranged such that a portion of the molded member that covers at least a portion of a surface of the lead electrodes also extends from the side surface of the recess towards a [the] center of the recess. *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 20:11-21:13; PTX520; PTX522.)

Claim 2:

[FF348] The Court finds that all of the claim limitations of Claim 2 of the '870 patent exist in and are met by the accused 62-217B and 62-227B series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

2[a] The molded package according to claim 1, wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion.

[FF349] The accused 62-217B and 62-227B series products are arranged so that at least one of the positive or negative lead electrodes in each pair of electrodes is divided by the wall portion. *See* (PTX520; PTX522); *see also* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 22:15-23:12.) Each of the positive and negative lead is divided into an upper exposed region and lower

exposed region by the white-resin wall portion. *See* (PTX520; PTX522); *see also* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 22:15-23:12.)

Claim 3:

[FF350] The Court finds that all of the claim limitations of Claim 3 of the '870 patent exist in and are met by the accused 62-217B and 62-227B series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

3[a] The molded package according to claim 2, wherein said wall portion is integral with said molded member.

[FF351] The accused 62-217B and 62-227B series products are arranged so that the wall portion (identified in claims 1 and 2) is integral with the molded member. The wall portion and molded member are formed of the same white resin material. *See* (PTX520; PTX522; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 22:15-23:12.) The wall portion and molded member are formed of the same white resin material.

Claim 7:

[FF352] The Court finds that all of the claim limitations of Claim 7 of the '870 patent exist in and are met by the accused 62-217B and 62-227B series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

[FF353] The additional limitations of claim 7 are analyzed below. *See* discussion, *supra* at **FF302** regarding differences between claims 1 and 7.

Preamble: A light emitting device comprising:

[FF354] The parties agree that the “accused 62-217B and 62-227B series products are light emitting devices.” (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 64.)

7[a] a light emitting element;

[FF355] The accused 62-217B and 62-227B series products include a light emitting element (claim element 7[a]). (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), Nos. 65.)

7[b] ... said light emitting element in substantially a center of the recess;

[FF356] The accused 62-217B and 62-227B series products include a molded member having a recess formed by a bottom surface and a side surface so as to mount a light emitting element in substantially a center of the recess (claim element 7[b]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 22:4-7.) The light emitting element is mounted in substantially a center of the recess. *See, e.g.*, (PTX520; PTX522.)

7[e] means for electrically connecting said light emitting element to said positive lead electrode, and said light emitting element to said negative lead electrode;

[FF357] The accused 62-217B and 62-227B series products include a means for electrically connecting the light emitting element to the positive lead electrode and the negative lead electrode. In order to perform the function of electrically connecting the light emitting element to the positive and negative lead electrodes, the accused 62-217B and 62-227B series products use wire bonded conductive wires to electrically connect the light emitting element to the positive and negative lead electrodes. *See* (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), Nos. 66 and 67.)

[FF358] In the accused 62-217B series products, one wire is attached at one end to the light emitting element and at the other end to the positive lead electrode; the other wire is attached to the opposite side of the light emitting element and to the negative lead electrode. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 68); *see also* (PTX520.) In the accused 62-227B series products, one wire is attached to one light emitting element and the positive lead

electrode, a second wire is attached to the other light emitting element and the negative lead electrode, and a third wire connects the light emitting elements. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 69); *see also* (PTX522.) In this arrangement, the light emitting elements are connected in series and a pair of wire bonded conductive wires electrically connected the light emitting element(s) to the positive and negative lead electrodes. Because the two light emitting elements are connected, they effectively act as a single light emitting element for the 62-227B.

Claim 10:

[FF359] The Court finds that all of the claim limitations of Claim 10 of the '870 patent exist in and are met by the accused 62-217B and 62-227B series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

10[a] The light emitting device according to claim 7, wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion.

[FF360] The accused 62-217B and 62-227B series products meet this limitation, for the same reasons stated above in connection with claim 2. *See* discussion, *supra* at **FF349**.

Claim 11:

[FF361] The Court finds that all of the claim limitations of Claim 11 of the '870 patent exist in and are met by the accused 62-217B and 62-227B series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

11[a] The light emitting device according to claim 10, wherein said wall portion is integral with said molded member.

[FF362] The accused 62-217B and 62-227B series products meet this limitation, for the same reasons stated above in connection with claim 3. *See* discussion, *supra* at **FF351**.

- iv. The EHP-A09K Series Products Literally Infringe the Asserted Claims of the '870 patent

Claim 7

[FF363] The Court finds that all of the claim limitations of Claim 7 of the '870 patent exist in and are met by the accused EPH-A09K series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

Preamble: A light emitting device comprising:

[FF364] The parties agree that “[t]he EHP-A09K series product is a light emitting device.” (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 70.)

7[a] a light emitting element;

[FF365] The accused EHP-A09K series product includes a light emitting element (claim element 7[a]). *See* (PTX506; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 24:16-19); *see, e.g.*, (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), Nos. 71-73.)

7[b] a molded member having a recess formed therein by a bottom surface and a side surface so as to mount said light emitting element in substantially a center of the recess;

[FF366] The accused EHP-A09K series product includes a molded member having a recess formed by a bottom surface and a side surface so as to mount a light emitting element in substantially a center of the recess (claim element 7[b]). (5/11/2015 PM Trial Tr., Dkt. No. 166, at 24:10-25:3; PTX506.)

[FF367] The molded member is a white resin material, with a recess having a bottom surface and a side surface. *See* (PTX506; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 24:10-25:3; PTX011.)

7[c] a positive lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;

7[d] a negative lead electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member;

[FF368] The accused EHP-A09K series products include a positive and negative lead electrode, each electrode partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from said molded member (claim elements 7[c] and 7[d]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 25:7-26:4; PTX506.)

[FF369] The accused EHP-A09K series products include both a positive lead electrode and a negative lead electrode, each partially disposed on the bottom surface and adjacent to the side surface in the recess and extending outwardly from the molded member. The accused EHP-A09K series products have positive and negative lead electrodes, each partially disposed on the bottom surface in the recess, lying near or adjoined to the side surface in the recess, and extending outwardly from the molded member. *See* (PTX506; PTX506); *see also* (PTX011; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 25:7-26:4.)

7[e] means for electrically connecting said light emitting element to said positive lead electrode, and said light emitting element to said negative lead electrode;

[FF370] The accused EHP-A09K series products include the claimed means for electrically connecting the light emitting element to the positive lead electrode and the negative lead electrode, as construed by the Court. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), Nos. 71-73); *see also* (PTX506.)

7[f] wherein a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other by a wall portion,

[FF371] For the accused EHP-A09K series products, a portion of said positive lead electrode and a portion of said negative lead electrode in the recess are separated from each other

by a wall portion (claim element 7[f]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 26:8-18; PTX506.)

[FF372] The accused EHP-A09K series products are arranged such that a portion of the positive lead electrode and a portion of the negative lead electrode in the recess are separated from each other by a wall portion. The accused EHP-A09K series products are arranged such that a portion of the positive lead electrode and a portion of the negative lead electrode in the recess are separated from each other by a portion of the molded package/molded member/device that covers at least a portion of a surface of the lead electrodes. *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 26:8-18; PTX506); *see also* (PTX011.)

7[g] wherein said wall portion extends inwardly in a direction toward the center of the recess.

[FF373] For the accused EHP-A09K series products, the wall portion extends inwardly in a direction toward a center of the recess (claim element 7[g]). *See* (5/11/2015 PM Trial Tr., Dkt. No. 166, at 27:1-19; PTX506.)

[FF374] The accused EHP-A09K series products are arranged such that the wall portion extends inwardly in a direction toward a center of the recess. The accused EHP-A09K series products are arranged such that a portion of the molded member that covers at least a portion of a surface of the lead electrodes also extends from the side surface of the recess towards a [the] center of the recess. *See* (PTX506; 5/11/2015 PM Trial Tr., Dkt. No. 166, at 27:1-19.)

Claim 9:

[FF375] The Court finds that all of the claim limitations of Claim 9 of the '870 patent exist in and are met by the accused EPH-A09K series products. The reasoning and further factual findings underpinning such are discussed in further detail below.

9[a] The light emitting device according to claim 7, further comprising a protective element mounted on at least one of said positive lead electrode and said negative lead electrode so as to protect said light emitting element from overvoltage.

[FF376] The accused EHP-A09K series products meet this limitation, because each includes a protective element (Zener diode) mounted on the positive (or negative) lead electrode to protect the light emitting element from overvoltage. (Stipulated Finding of Fact (Dkt. No. 132, Ex. 2), No. 74); *see also* (PTX506.)

F. The Prior Art Directed Toward '870 patent

[FF377] The asserted claims of the '870 patent would not have been obvious to one of ordinary skill in the art at the time of the inventions in view of two references: U.S. Patent No. 6,624,491 (DTX368) ("Waitl") and U.S. Patent No. 6,747,293 (DTX343) ("Nitta"). The reasoning and further factual findings underpinning such are discussed in further detail below.

i. The Relied-Upon References Fail to Disclose Numerous Limitations of the Asserted Claims

1. Waitl is Directed to a Diode Housing in which a Chip is Mounted on One Lead Electrode Having a Single Exposed Bonding Area and is Connected by a Single Wire to Another Lead Electrode Having a Single Exposed Bonding Area

[FF378] U.S. Patent No. 6,624,491 ("Waitl"), entitled "Diode Housing" issued on September 23, 2003. (Waitl; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 45:25-46:2.)

[FF379] Waitl is directed to problems in the operation of a device stemming from delamination—a situation in which the "window" encapsulant material separates from the metal frame of the device. (Waitl, col. 2, ll. 33-39.)

[FF380] According to Waitl, "temperature variations [a]ffect the thermal coefficients of the window, side walls and carrier frame causing dimensional changes in each at possibly differing rates." (Waitl, col. 2, ll. 30-33.) In these circumstances, the components of a device may separate, and "[s]uch gaps result in radiation absorption and/or internal reflections thereby

diminishing the amount of radiation being emitted from or incident to” the light emitting chip. (Waitl, col. 2, ll. 36-39.) Moreover, “the gap can continue . . . thereby opening the housing up to moisture penetration which will damage the chip and accelerate del[amin]ation.” (Waitl, col. 2, ll. 40-44.)

[FF381] Waitl is directed to reducing delamination of a transparent resin in a device by minimizing the exposure of metal electrodes to the transparent resin. *See* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 47:3-12; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 87:3-7; Waitl, col. 4, ll. 1-2); *see also* (Waitl, Abstract; Waitl, col. 5, ll. 8-10, 32-35.)

[FF382] With these objectives in mind, the housing disclosed in Waitl specifies: (i) “a cavity extending inwards from the top of the housing”; (ii) “conductor portions” (*i.e.*, lead electrodes) with “respective areas that are exposed at the bottom of the housing”; (iii) “a semiconductor chip [that] is bonded to one of the exposed areas,” and (iv) “a wire [that] bonds the chip to the second exposed area.” (Waitl, Abstract.) Specifically, Waitl is directed to a device in which there is only one exposed area on each lead electrode, for die-bonding and wire bonding, respectively; moreover, the size of each exposed area is limited to the extent possible. *See* (Waitl, Abstract, col. 3, ll. 36-44.)

[FF383] As shown in Figures 1 and 2, Waitl discloses a housing 20 having a first conductor portion 3a that extends outwards to form external conductor (lead electrode) 4, and having a second conductor (lead electrode) 3b that extends outward to form external conductor 5. (Waitl, Figs. 1, 2, col. 4, ll. 39-59.) Moreover, each conductor portion has only a single exposed bonding area – die-bonding area 6 and wire-bonding area 7, respectively. A semiconductor chip 1 is positioned on first conductor portion 3a, and a single wire 11 electrically connects the semiconductor chip 1 to the second conductor portion 3b. (Waitl, col. 4, ll. 39-59, col. 3, ll. 21-

48.) The exposed areas 6 and 7 are openings in a “bottom wall” 13 that covers the remaining areas of the lead electrodes. (Waitl, col. 5, ll. 8-10, 32-35.)

[FF384] Waitl does not disclose a configuration in which the light-emitting element is connected to the positive and negative lead electrodes by two separate wires or an equivalent thereof. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 85:18-22); *see* (Waitl, col. 3, ll. 27-45; Figs. 1, 2.)

[FF385] Waitl does not disclose a configuration in which the wall portion divides either the positive lead electrode or the negative lead electrode into separate bonding areas. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 85:16-22.)

[FF386] Accordingly, Waitl does not disclose or suggest the following elements of the asserted claims of the '870 patent:

- “wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion” (Claim 2), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 85:16-22);
- “means for electrically connecting said light emitting element to said positive lead electrode, and said light emitting element to said negative lead electrode” (Claim 7), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 85:16-20);
- “wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion” (Claim 10), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 85:16-22.)

[FF387] Furthermore, Waitl does not mention in its text or in its figures a protective element. *See, e.g.*, (Waitl.)

2. Nitta is Directed to a Device in Which a Portion of a Lead Electrode Is Divided into Die-Bonding and Wire-Bonding Regions by Flat Slits

[FF388] Nitta is directed to a light emitting device with a “plurality of chips efficiently disposed” in a housing with a “lead having a slit formed between a portion for bonding a wire to and a portion for mounting chips on, thereby to prevent extrusion of an adhesive and eliminate

defective bonding.” (Nitta, Abstract); *see* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:20-22); *see also* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 48:6-9.)

[FF389] Nitta intended to create a higher power LED device by using multiple chips in the LED housing; however, the housing of a traditional LED device (shown in Figure 37A) could not “provide a sufficient space for mounting the chip and for bonding the wire as well.” (Nitta, col, 2, ll. 7-25.)

[FF390] Nitta discloses several embodiments, each of which includes a slit in a lead electrode that divides the lead electrode into a die-bonding and a wire-bonding area. *See* (Nitta, col. 4, ll. 4-10.) Nitta further discloses a light emitting device with a “plurality of chips efficiently disposed” in the housing where a “slit” is situated to “prevent extrusion of an adhesive and eliminate defective bonding,” without greatly increasing the size of the device. (Nitta, Abstract, Summary of the Invention.)

[FF391] The embodiment in Figure 1A in Nitta shows a device that has light emitting elements 106A and 106B, mounted on the leads with an adhesive paste. (Nitta, col. 10, l. 66–col. 11, l. 7.) Slits 101G and 102G separate the portions of the lead designated for die- and wire-bonding respectively, and are designed to “keep[] the portion for bonding the wire clean even when silver paste, for example, extrudes upon mounting the chip, and thereby eliminates defective bonding of wires.” (Nitta, col. 11, ll. 10-17.)

[FF392] Nitta discloses a second embodiment, in Figure 17 (below), that includes a “plurality of vertically stacked chips.” (Nitta, col. 17, ll. 17-20.) According to Nitta, this embodiment has the advantage of occupying less space, and a conventional package can therefore be used. (Nitta, col. 18, ll. 9-16.) This configuration also requires only a single wire,

thereby minimizing the number of bond wires and “improv[ing] reliability.” (Nitta, col. 18, ll. 25-30.)

[FF393] Nitta does not disclose a configuration that includes a bottom wall, wall portion, or similar structure within the recess of the package housing. *See, e.g.*, (5/13/2015 PM Trial Tr., Dkt. No. 171, at 85:25-86:6.)

[FF394] Accordingly, Nitta does not disclose or suggest the following elements of the asserted claims of the '870 patent:

- “wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion” (Claim 2), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 85:25-86:2);
- “The molded package according to claim 2, wherein said wall portion is integral with said molded member.” (Claim 3), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:5-6);
- “wherein at least one of said positive lead electrode and said negative lead electrode is divided by said wall portion” (Claim 10), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:3-4);
- “The light emitting device according to claim 10, wherein said wall portion is integral with said molded member.” (Claim 11), (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:5-6).

ii. Waitl Teaches Away from the Inventions Claimed in the Asserted Claims of the '870 patent

[FF395] Waitl teaches away from the features of the '870 patent. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:23-87:15.)

[FF396] Waitl is “looking to minimize the amount of metal exposed. It identifies delamination between the encapsulant and the resin can cause optical losses, as well as reduce – reduced reliability due to moisture intrusion.” (5/13/2015 AM Trial Tr., Dkt. No. 170, at 47:7-12); *see also* (Waitl, col. 5, ll. 8-10.)

iii. A Person of Ordinary Skill in the Art Would Not Have Been Motivated To Combine Waitl and Nitta

[FF397] Furthermore, a person of ordinary skill in the art nonetheless still would not have been motivated to, or had reason to, combine Waitl and Nitta. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:8-22.)

[FF398] Although Waitl and Nitta are both directed to surface-mount LEDs, they are not similar structures. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:8-22.) Nitta has no bottom wall or wall portion. Nitta has die-bonding and wire-bonding areas on individual lead electrodes, with these areas separated by slits. Waitl minimizes the exposed surface of the lead electrodes to one die-bonding area and one wire-bonding area. Waitl is directed to a device that minimizes or eliminates problems associated with delamination, whereas Nitta is directed to a device that minimizes or eliminates problems associated with extrusion of adhesives. Accordingly, the Waitl and Nitta devices differ with respect to the structure, design, components, and purposes.

[FF399] Further, the devices disclosed in Nitta and Waitl are not directed to resolving similar problems. The device in Nitta is directed to overcoming problems associated with die bonding through the use of slits between the die bonding area and the wire bonding area on a single lead electrode. In particular, Nitta is concerned about the extrusion of adhesive from the die bonding area to the wire bonding area. *See* (Nitta, Abstract.) The problems addressed in Waitl are associated with the delamination of the encapsulant at the interface of the encapsulation material and the exposed lead frame. *See* (Waitl, Abstract.) For this reason, as noted above, Nitta divides die bonding and wire bonding areas on a given lead electrode with slits, while Waitl is directed to a device in which the die- and wire- bonding areas are isolated by a wall portion that is otherwise covered by the bottom wall. Thus, Nitta and Waitl do not address similar problems protecting against defective wire bonding.

[FF400] Nitta and Waitl also do not provide similar solutions on separation of lead electrodes. In Waitl, the lead electrodes are exposed to the minimum extent possible, with only a single exposed area on each one. There is no reference in Waitl to slits (or any similar structure) between lead electrodes or between bonding areas on a single lead electrode. In Nitta, the open areas of the lead electrodes are separated by slits. Nitta does not have a bottom wall or any similar structure that isolates or separates die- and wire-bonding areas. The references, therefore, do not provide similar solutions on separation of lead electrodes. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 87:8-15.)

[FF401] Neither Waitl nor Nitta discloses the combination of elements in the asserted claims of the '870 patent, including, “first, a wall separating the positive and negative lead electrode. Second, the wall portion extending inwardly to the center of the recess. Third, the wall portion dividing a lead electrode into two areas. And, fourth, two wires and a protective element.” *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 84:23-85:10.)

[FF402] Given the differences between the structure of the device disclosed in Waitl and the structure of the device disclosed in Nitta, a person of ordinary skill in the art would not have been prompted to attempt to incorporate the structure of Nitta into the structure of Waitl. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:8-22.)

[FF403] Waitl discloses a device in which there is only one exposed area on a lead electrode for die bonding, and only one exposed area on the other lead electrode for wire bonding. (Waitl, Abstract; col. 3, ll. 20-48.) The remainder of the lead electrodes is covered by the bottom wall, except to the extent required for the die-bonding and wire-bonding operations. This feature of the device disclosed in Waitl, which is essential to minimizing the exposed area of the lead electrode, reduces or eliminates the problems associated with delamination. Nitta,

however, has no bottom wall, or other structure that covers, divides, or separates die bonding and wire bonding areas. Rather, Nitta uses slits to distance the die-bonding and wire-bonding areas, including areas on a single lead – to avoid extrusion of the adhesive material. *See* (Nitta, Abstract.)

[FF404] Indeed, a person of ordinary skill in the art would have recognized that Nitta discloses separation of bonding areas on a lead electrode by means of slits; one of ordinary skill would have recognized that the structure does not cover the bonding surfaces. (Nitta, Abstract.) Thus, there is no teaching or suggestion (and no witness testified as to a teaching or suggestion) that would have guided one of ordinary skill in the art to modify the slits of Nitta according to the teachings of the '870 patent.

[FF405] Nor would the combination of Waitl and Nitta lead one of ordinary skill to other elements of the '870 patent claims. A person of ordinary skill would have noted that Waitl discloses embodiments that minimize the electrode area that is exposed to provide connections for the light emitting element. Adding a wall portion that divides a lead electrode into two bonding areas would have the effect of creating an additional bonding area, and thereby result in the exposure of more of the surface of the lead frame. Such a step would violate the teaching of Waitl with regard to the exposure of more of the metal surface than is required for bonding purposes. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:25-87:15.)

[FF406] One of ordinary skill in the art would have recognized that a configuration that requires two wires is contrary to the teachings of Waitl, because such a configuration would require an additional exposed wire bonding area compared to Waitl's one-wire configuration. Waitl specifies a device in which a conductor has only two exposed areas, one to accommodate the semiconductor chip, and the other to accommodate the *single* wire of the device. (Waitl, col.

3, ll. 21-45.) Accordingly, Waitl does not provide for an exposed area on a conductive member to accommodate the bonding of a second wire. *See* (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:25-87:7, 87:16-20.)

[FF407] If a second wire were used to provide electrical connection, an additional area of the external conductor 3b would have to be exposed to provide more space for a wire bonding region. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 87:16-20.) This latter configuration would increase the area of contact between the material in the window 10 and the conductor 3b that is exposed to the window 10. *See* (Nitta, Fig. 2.) A person of ordinary skill also would have recognized that a two-wire configuration is undesirable because it increases the risk of “delamination brought about by the different thermal expansions of the window and conductor.” *See* (Waitl, Abstract.) The delamination “result[s] in radiation absorption and/or internal reflections[,] thereby diminishing the amount of radiation being emitted from or incident to chip 101.” (Waitl, col. 2, ll. 36-39.) A two-wire configuration thus runs counter to the teaching of Waitl, which seeks to “minimiz[e] the area of the conductor exposed to the window” 10. *See* (Nitta, Abstract; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:25-87:15.)

[FF408] Accordingly, a person of ordinary skill in the art would have understood the teaching of Waitl to be limited to a single wire design. Such a person would not have combined Waitl with Nitta to design a new device using a pair of conductive wires to provide electrical connection for the light emitting chip, thereby increasing the risk of delamination and reduced performance. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 86:25-87:15.)

[FF409] Nitta also discloses an embodiment that employs vertically stacked chips, emphasizing that this design “can connect the chips to the lead with only one wire,” and noting that this “minimizes the problems caused by deformation or breakage of wire, and thereby

improves the reliability.” (Nitta, at col. 18, ll. 25-30.) Thus, in view of the caution in Nitta regarding a two-wire configuration, one of ordinary skill would not have modified the one-wire configuration in Waitl to a two-wire configuration as required by claims 9, 10, and 11 of the ’870 patent.

VIII. The Permanent Injunction

[FF410] The terms of any injunction which might be issued by the Court with respect to any one of Everlight LED series 45-21S, 62-217D, and/or 62-257D would also apply to Everlight LED series 67-21S. (Parties’ Third Additional Stipulations Re: Trial, Dkt. No. 157, ¶ 3.)

A. Competition Between the Parties

[FF411] Nichia is an LED chip manufacturer and as well as a packager, while Everlight is solely an LED packager. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 27:25-28:15; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 11:19-12:17.)

[FF412] Head to head competition between Nichia and Everlight in the U.S. for the accused products is very rare. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 29:6-30:4.)

[FF413] Everlight sells a broader array of products than Nichia, such that only a third of Everlight’s products overlap with Nichia’s products. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 26:22-27:24.)

[FF414] Everlight has attempted direct LED sales in the U.S. with almost no success. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 23:25-26:13; PTX0261; PTX0294; PTX0344; PTX0370; PTX0378; PTX0406; PTX0408; PTX0565; PTX0578; PTX0637-38; PTX0641.)

[FF415] Everlight generally sells to distributors rather than directly to customers, as Nichia does. (5/12/2015 PM Trial Tr., Dkt. No. 168, at 25:10-26:20, 30:5-31:23; DTX0409.)

[FF416] There is no overlap between Nichia and Everlight with respect to Nichia's top 20 customers in the U.S. for the accused products. *Compare* (DTX0409) *with* (PTX0565.)

[FF417] Nichia cannot identify any competition with Everlight in the automotive sector. (5/12/2015 PM Trial Tr., Dkt. No. 167, at 51:15-52.)

[FF418] While Nichia's internal documents show that Nichia America had 516 U.S. sales opportunities (representing \$360 million of its products) which it claimed were in competition with Everlight, Everlight is identified in only 3 of such 516 sales opportunities reflecting total potential sales of \$50,000. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 27:24-30:15; DTX0116.)

[FF419] Lights of America, the customer identified by Nichia as an example of a lost sale, is not on Nichia's list of top 20 customers. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 99:2-17; PTX0565.)

[FF420] Nichia's documents do not identify Everlight as a major competitor in the United States. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 106:11-22; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 26:1-27:23; PTX0251.)

[FF421] In seven years of alleged infringing sales, Nichia's damages expert identified only one claimed lost sale of \$17,000 to Lights of America and just one claimed instance of price erosion. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 100:8-101:13; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 33:11-34:18.)

B. There are Many Licensed Competitors to Nichia

[FF422] The United States LED market consists of many competitors to Nichia America, with the top ten competitors and Nichia America making up most of the market. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 12:18-13:18; PTX0421; PTX0560.)

[FF423] In the areas in which Nichia and Everlight compete in the U.S., there are at least 10 different branded overlapping competitors. (5/12/2015 PM Trial Tr., Dkt. No. 167, at 28:16-29:9.)

[FF424] Nichia admits that there are many large U.S. competitors (over \$100 million per year in the U.S. for LED sales) that compete with Nichia's practicing product, including Samsung, Cree, Lumileds, Osram, Toyoda Gosei, and Seoul Semi-Conductor. (5/12/2015 PM Trial Tr., Dkt. No. 167, at 87:21-90:3.)

[FF425] Nichia has licensed approximately 41% of the worldwide LED market to practice the patents-in-suit. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 12:18-14:10.)

C. One Alleged Instance of Lost Sales to Everlight

[FF426] Nichia's expert has only identified one instance of a documented lost sale to Everlight. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 100:8-101:2.)

[FF427] Nichia alleges that Nichia America lost sales to one U.S. customer, Lights of America, because of Everlight's competition with an accused product at a lower price. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 82:8-84:13; PTX0652; PTX0654; PTX0294.)

[FF428] At the time of this sales opportunity, Nichia America was a current supplier to Lights of America of other LED products, while Everlight was not a supplier to Lights of America. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 83:12-25; PTX0652; PTX0654.)

[FF429] Nichia's expert Dr. Lynde admitted he did not analyze whether Nichia would have made the claimed lost sale to Lights of America in the absence of Everlight's competition. He also admitted that in a multi-competitor market there is a certain level of analysis required to determine if Nichia America would have made any additional sales in Everlight's absence. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 112:17-114:21, 115:25-116:5, 119:13-121:14; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 148:6-154:10.)

[FF430] The Lights of America sales opportunity included many competitors, such as Seoul Semiconductor, which offered the desired 5630 LED form factor. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 101:15-21, 112:22-114:16; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 148:6-154:10; PTX0652; PTX0654; PTX0326; DTX0119.)

[FF431] Nichia America's prices were considered too high compared to Everlight and Seoul Semiconductor, both of which offered the desired form factor with performance that was "good enough" for the customer. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 83:12-84:10, 112:22-114:16; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 148:6-154:10; PTX0652; PTX0654; DTX0119.)

[FF432] Nichia's expert Dr. Lynde acknowledged that Seoul Semiconductor and Lumileds were "major threats" to Nichia on the same products. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 101:15-22, 112:17-114:21, 119:13-121:14; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 148:6-154:10; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 32:13-33:5; PTX0326; DTX0121.)

[FF433] Nichia's expert was unable to point to any documented evidence of lost sales to Everlight in the United States related to the Accused Products. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 100:14-101:2.)

[FF434] Nichia did not attempt to calculate: (a) Nichia Corporation's or Nichia America's relevant market share for the products at issue; or (b) any market share lost to Everlight. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 106:23-108:4.)

D. One Alleged Instance of Price Erosion Caused By Defendants

[FF435] Nichia claims that its subsidiary, Nichia America, was forced to drop its prices to General Electric ("GE") because of competition from Everlight selling Accused Products at lower prices. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 86:17-88:14.)

[FF436] In 2013, Nichia America was trying to sell the 757 LED to GE for use in its A19 lamp, which is a replacement for the standard incandescent light bulb. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 85:6-15, 86:14-87:18; PTX0656.)

[FF437] Nichia claims it was targeting \$0.14 for the 757, but admitted at trial that it was already scheduled to lower its price to GE to \$0.128 in the first quarter of 2014. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 87:12-18; PTX0656.)

[FF438] In July 2013, Everlight attempted to compete for GE's global business on the A19 lamp with Everlight's accused product, the XI3535, at a price of \$0.095 per unit. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 85:18-86:9; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 156:21-160:8; PTX0362; PTX0364.)

[FF439] In August 2013, GE told Nichia America that regardless of the LED product used in GE's value A19 lamp, the LED would have to be priced at \$0.090 per unit by July 2014. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 135:5-137:17; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 160:9-161:3; DTX0120.)

[FF440] Nichia America responded by lowering its price to \$0.092, and as a result obtained the business. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 87:21-88:16; PTX0658.)

[FF441] Nichia's internal documents identified GE as a customer to "protect at any cost," and identified the 5630 and 5251 products of Samsung, LG, Seoul Semiconductor, and Lumileds as competing with Plaintiff's 757 LED products, with Seoul Semiconductor's and Lumileds' products being priced at \$0.09. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 101:23-103:3, 138:24-141:1; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 161:4-19; PTX0251; PTX0120; PTX0121.)

[FF442] Additional internal documents of Nichia show that Seoul Semiconductor was offering a competing product to Nichia's 757 LED products at prices of \$0.08-\$0.09 per unit. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 101:23-103:3, 119:13-120:11, 139:12-143:15; 5/13/2015 AM Trial Tr., Dkt. No. 170, at 161:4-162:9; DTX0121; DTX0565; DTX0119; PTX0121.)

[FF443] Moreover, Nichia itself was already selling its 757 product to GE's competitors at \$0.08-\$0.09 per unit in the same time period. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 139:12-141:5; DTX0565.)

[FF444] In this same time period, the LED industry was already experiencing downward pricing pressure, and Nichia had been experiencing pricing pressure from many of the other larger, and licensed, competitors. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 128:4-8; 5/12/2015 AM Trial Tr., Dkt. No. 167, at 36:20-40:2.)

[FF445] Nichia's damages expert, Dr. Lynde, did not perform a price erosion analysis to determine whether GE would have purchased the 757 products from Nichia America at any price higher than \$0.092 absent the alleged competition from Everlight, and admitted there wasn't sufficient evidence to establish price erosion. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 108:5-109:6, 110:1-10, 128:9-129:13.)

[FF446] Dr. Lynde admitted that GE told Nichia that GE needed eight (8) LEDs for \$0.72 in order for the A19 lamp to be economically viable, which meant Nichia could only charge \$0.09 per LED. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 132:14-16, 135:3-138:13; DTX0120.)

[FF447] Accordingly, despite Nichia's claim that it intended to sell its 757 to GE at a higher price, GE was not going to purchase from Nichia, and potentially not move forward with the A19 lamp project, unless it obtained its \$0.09 price. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 132:14-16, 135:3-138:13; DTX0120.)

[FF448] Nichia admitted it was impossible to keep pricing a secret between GE and TCP, therefore Nichia could not charge GE higher prices than TCP for the same products even if it wanted to. (5/12/2015 AM Trial Tr., Dkt. No. 167, at 38:24-40:2.)

E. Nichia has Licensed the Patents-In-Suit Many Times

[FF449] Nichia has licensed the patents-in-suit at least six times, including to five competitors (Lumileds, OSRAM, Seoul Semiconductor, Sharp, and Toyoda Gosei) that make up forty-one percent (41%) of the worldwide market share for LED sales. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 90:23-91:15; 5/13/2015 PM Trial Tr., Dkt. No. 171, at 12:18-13:18.)

[FF450] As discussed above, Nichia has identified the 3030 LED products of Lumileds and Seoul Semiconductor as lower priced "major threats" to its 757 product series and both competitors are licensed to practice the patents-in-suit. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 119:13-120:11; PTX0121.)

[FF451] Nichia contends it has a policy against licensing its intellectual property solely for money and that each of its prior licenses to a competitor was done in part for strategic reasons. (5/11/2015 PM Trial Tr., Dkt. No. 166, at 90:21-91:15.)

CONCLUSIONS OF LAW (“CL”)

I. Defendants Infringe Nichia’s Patents

A. Legal Standards for Infringement

i. Infringement under 35 U.S.C. § 271(a)

[CL1] A party directly infringes a patent if it makes, uses, sells, or offers to sell any patented invention within the United States, or imports into the United States any patented invention during the term of the patent. 35 U.S.C. § 271(a).

[CL2] To prove infringement under 35 U.S.C. § 271, a plaintiff must show the presence of every element, or its equivalent, in the accused product or service. *Lemelson v. United States*, 752 F.2d 1538, 1551 (Fed. Cir. 1985). First, the claim must be construed to determine its scope and meaning; and second, the construed claim must be compared to the accused device or service. *Absolute Software, Inc. v. Stealth Signal, Inc.*, 659 F.3d 1121, 1129 (Fed. Cir. 2011) (citing *Carroll Touch, Inc. v. Electro Mech. Sys., Inc.*, 15 F.3d 1573, 1576 (Fed. Cir. 1993)).

[CL3] Infringement must be proved by a preponderance of the evidence. *Conroy v. Reebok Int’l, Ltd.*, 14 F.3d 1570, 1573 (Fed. Cir. 1994). Direct infringement may be established by circumstantial evidence. *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1272 (Fed. Cir. 1986) (“Circumstantial evidence is not only sufficient, but may also be more certain, satisfying and persuasive than direct evidence.”) (quoting *Michalich v. Cleveland Tankers, Inc.*, 364 U.S. 325, 330 (1960)).

ii. Infringement under 35 U.S.C. § 271(g)

[CL4] Under the Patent Act, “[w]hoever without authority imports into the United States or offers to sell, sells, or uses within the United States a product which is made by a process patented in the United States shall be liable as an infringer, if the importation, offer to

sell, sale, or use of the product occurs during the term of such process patent.” 35 U.S.C. § 271(g). A product that is made by the patented process will “not be considered to be so made after – (1) it is materially changed by subsequent process; or (2) it becomes a trivial and nonessential component of another product.” *Id.*

B. Defendants Infringe Claims 17, 19, and 21 of the '250 patent Under 35 U.S.C. § 271(a)

- i. Defendants' Importation Into the United States, and Sale and/or Offer for Sale in the United States of the XI3030 and XI3535 Series Products Infringes Claims 17 and 21 of the '250 patent.

[CL5] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused XI3030 and XI3535 series products. *See FF36-FF37.* Everlight's and Everlight Americas' importation, sale, and /or offer for sale of the accused XI3030 and XI3535 series products constitutes infringement of claims 17 and 21 of the '250 patent under 35 U.S.C. § 271(a). *See FF71-F81.*

[CL6] The accused XI3030 and XI3535 series products contain every limitation of claims 17 and 21 of the '250 patent. *See FF71-F81.* The preponderance of the evidence at trial proved that the accused XI3030 and XI3535 series products literally infringe claims 17 and 21 of the '250 patent.

- ii. Defendants' Importation into the United States, and Sale and/or Offer for Sale in the United States of the 62-217D, 62-257D, and 45-21S Series Products Infringes Claims 17, 19, and 21 of the '250 patent .

[CL7] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused 62-217D, 62-257D, and 45-21S series products. *See FF36-FF37.* Everlight's and Everlight Americas' importation, sale, and /or offer for sale of the accused 62-217D, 62-257D, and 45-21S series products constitutes infringement of claims 17, 19, and 21 of the '250 patent under 35 U.S.C. § 271(a)

[CL8] The accused 62-217D, 62-257D, and 45-21S series products contain every limitation of claims 17, 19, and 21 of the '250 patent. *See* **FF82-FF110**. The preponderance of the evidence at trial demonstrated that these products literally infringe claims 17, 19, and 21 of the '250 patent.

C. Defendants Infringe Claims 1 and 7 of the '250 patent under 35 U.S.C. § 271(g)

- i. Defendants' Importation into the United States, Offers to Sell, and Sales Within the United States of the XI3030 and XI3535 Series Products Constitute Infringement of Claims 1 and 7 of the '250 patent.

[CL9] Everlight and/or Everlight Americas import, offer for sale, and sell the accused XI3030 and XI3535 series products in the United States. *See* **FF36-FF37**. Everlight and Everlight Americas' importation into the United States, offers to sell, and sales within the United States of the accused XI3030 and XI3535 series products constitutes infringement of claims 1 and 7 of the '250 patent under 35 U.S.C. § 271(g).

[CL10] As detailed above, the process used to manufacture the accused XI3030 and XI3535 series products includes each step of claims 1 and 7 of the '250 patent. *See* **FF44-FF70**. The preponderance of the evidence at trial showed that Defendants' importation into the United States, offers to sell, and sales within the United States of the accused XI3030 and XI3535 series products infringe claims 1 and 7 of the '250 patent.

[CL11] "Infringement under § 271(g) does not consist of the making of a product by a process patented in the United States; it is the importation, offer to sell, sale, or use of a product made by such process." *Bio-Tech. Gen. Corp. v. Genentech, Inc.*, 80 F.3d 1553, 1560 (Fed. Cir. 1996).

D. Defendants Infringe Claims 1 and 2 of the '589 patent Under 35 U.S.C. § 271(a)

- i. Defendants' Importation Into the United States, and Sale, and/or Offer for Sale in the United States of the 61-238 Series Products Literally Infringes Claim 1 of the '589 patent

[CL12] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused 61-238 series products. *See* **FF191–FF192**. Everlight's and Everlight Americas' importation, sale, and/or offer for sale of the accused 61-238 series products constitutes infringement of claim 1 of the '589 patent under 35 U.S.C. § 271(a).

[CL13] The accused 61-238 series products contain every limitation of claim 1 of the '589 patent. *See* **FF197-FF210**. The preponderance of the evidence at trial proved that the accused 61-238 series products literally infringe claim 1 of the '589 patent.

- ii. Defendants' Importation Into the United States, and Sale and/or Offer for Sale in the United States of the 67-11 and 67-21 Series Products Literally Infringes Claim 2 of the '589 patent

[CL14] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused 67-11 and 67-21 series products. *See* **FF191–FF192**. Everlight's and Everlight Americas' importation, sale, and/or offer for sale of the accused 67-11 and 67-21 series products constitutes infringement of claim 2 of the '589 patent under 35 U.S.C. § 271(a).

[CL15] The accused 67-11 and 67-21 series products contain every limitation of claim 2 of the '589 patent. *See* **FF211-FF223**. The preponderance of the evidence at trial proved that the accused 67-11 and 67-21 series products literally infringe claim 2 of the '589 patent.

E. Defendants Infringe Claims 2, 3, 9, 10, and 11 of the '870 patent Under 35 U.S.C. § 271(a)

- i. Defendants' Importation Into the United States, and Sale and/or Offer for Sale in the United States of the 61-238 Series Products Literally Infringes the Asserted Claims of the '870 patent

[CL16] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused 61-238 series products. *See* **FF287-FF311**. Everlight's and Everlight Americas' importation, sale, and/or offer for sale of the accused 61-238 series products constitutes infringement of claims 2, 3, 10, and 11 of the '870 patent under 35 U.S.C. § 271(a).

[CL17] The accused 61-238 series products contain every limitation of claims 2, 3, 10, and 11 of the '870 patent. *See* **FF287-FF311**. The preponderance of the evidence at trial proved that the accused 61-238 series products literally infringe claims 2, 3, 10, and 11 of the '870 patent.

- ii. Defendants' Importation Into the United States, and Sale and/or Offer for Sale in the United States of the 67-11 Series Products, Literally Infringes the Asserted Claims of the '870 patent

[CL18] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused 67-11 series products. *See* **FF279-FF280**. Everlight's and Everlight Americas' importation, sale, and/or offer for sale of the accused 67-11 series products constitute infringement of claims 2, 3, 9, 10, and 11 of the '870 patent under 35 U.S.C. § 271(a).

[CL19] The accused 67-11 series products contain every limitation of claims 2, 3, 9, 10, and 11 of the '870 patent. *See* **FF312-FF337**. The preponderance of the evidence at trial proved that the accused 67-11 series products literally infringe claims 2, 3, 9, 10, and 11 of the '870 patent.

iii. Defendants' Importation Into the United States, and Sale and/or Offer for Sale in the United States of the 67-21 Series Products, Literally Infringes the Asserted Claims of the '870 patent

[CL20] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused 67-21 series products. *See* **FF279-FF280**. Everlight's and Everlight Americas' importation, sale, and/or offer for sale of the accused 67-21 series products constitute infringement of claims 2, 3, 10, and 11 of the '870 patent under 35 U.S.C. § 271(a).

[CL21] The accused 67-21 series products contain every limitation of claims 2, 3, 10, and 11 of the '870 patent. *See* **FF312-FF337**. The preponderance of the evidence at trial proved that the accused 67-21 series products literally infringe claims 2, 3, 10, and 11 of the '870 patent.

iv. Defendants' Importation Into the United States, and Sale and/or Offer for Sale in the United States of the 62-217B and 62-227B Series Products, Literally Infringes the Asserted Claims of the '870 patent

[CL22] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused 62-217B and 62-227B series products. *See* **FF279-FF280**. Everlight's and Everlight Americas' importation, sale, and/or offer for sale of the accused 62-217B and 62-227B series products constitute infringement of claims 2, 3, 10, and 11 of the '870 patent under 35 U.S.C. § 271(a).

[CL23] The accused 62-217B and 62-227B series products contain every limitation of claims 2, 3, 10, and 11 of the '870 patent. *See* **FF338-FF362**. The preponderance of the evidence at trial proved that the accused 62-217B and 62-227B series products literally infringe claims 2, 3, 10, and 11 of the '870 patent.

- v. Defendants' Importation Into the United States, and Sale and/or Offer for Sale in the United States of the EHP-A09K Series Products Literally Infringes the Asserted Claims of the '870 patent

[CL24] Everlight and/or Everlight Americas import into the United States, and sell and/or offer for sale in the United States the accused EHP-A09K series products. *See* **FF279-FF280**. Everlight's and Everlight Americas' importation, sale, and/or offer for sale of the accused EHP-A09K series products constitute infringement of claim 9 of the '870 patent under 35 U.S.C. § 271(a).

[CL25] The accused EHP-A09K series products contain every limitation of claim 9 of the '870 patent. *See* **FF363-FF376**. The preponderance of the evidence at trial proved that the accused EHP-A09K series products literally infringe claim 9 of the '870 patent.

II. The Asserted Claims of the Nichia Patents Are Not Invalid

A. Legal Standards for Validity

- i. Presumption of Validity and Burden of Proof

[CL26] A United States patent is presumed to be valid. A party challenging the validity of a patent bears the burden of proving invalidity by clear and convincing evidence. *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012). Clear and convincing evidence is evidence that produces “an abiding conviction that the truth of [the] factual contentions are ‘highly probable.’” *Id.* (quoting *Colorado v. New Mexico*, 467 U.S. 310, 316 (1984)). Each claim of a patent stands alone for validity purposes. *Jones v. Hardy*, 727 F.2d 1524, 1528 (Fed. Cir. 1984) (“[E]ach claim must be considered as defining a separate invention.”).

[CL27] The “clear and convincing evidence” standard always remains the same, regardless of whether the asserted prior art was (or was not) previously before or considered by the Patent Office. However, the fact that a prior art reference was in fact previously before the

Patent Office may affect the weight accorded to the reference. *Microsoft Corp. v. i4i Ltd. P'ship*, 131 S.Ct. 2238, at 2251 (2011). Thus, it may be harder to meet the “clear and convincing evidence” standard where a proffering party has relied on the same arguments and/or prior art that was previously before the Patent Office. *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1366 (Fed. Cir. 2007) (“When the party asserting invalidity relies on references that were considered during examination or reexamination, that party bears the added burden of overcoming the deference that is due to a qualified government agency presumed to have done its job.”) (internal quotation and citation omitted); *SSL Servs., LLC v. Citrix Sys., Inc.*, 940 F. Supp. 2d 480, 500 (E.D. Tex. 2013) (“While the jury’s verdict is independent of the analysis undertaken at the USPTO, the USPTO decision at least validates the jury’s finding that claims 2, 4 and 7 of the ‘011 patent are not invalid under 35 U.S.C. § 102 and § 103.”), *aff’d*, 769 F.3d 1073 (Fed. Cir. 2014).

ii. Obviousness

[CL28] A patent claim is invalid for obviousness under 35 U.S.C. § 103 only if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious to a person of ordinary skill in the art to which the invention pertains at the time the invention was made. A reference that qualifies as prior art under 35 U.S.C. § 102 may be considered in determining obviousness under 35 U.S.C. § 103 either alone, or in combination with another reference. The obviousness of the claimed subject matter should be viewed from the perspective of a fictitious person having ordinary skill in the art, who is presumed to have knowledge of all prior art. *See Custom Accessories, Inc. v. Jeffrey-Allan Indus.*, 807 F.2d 955, 962 (Fed. Cir. 1986) (“The person of ordinary skill is a hypothetical person who is presumed to be aware of all [of] the pertinent prior art.”).

[CL29] The following four factors are considered when determining whether a patent claim is obvious: (1) the level of ordinary skill in the pertinent art at the time the invention was made; (2) the scope and content of the prior art; (3) the differences between the prior art and the patent claims at issue; and (4) objective evidence of nonobviousness, if any. *Robotic Vision Sys. v. View Eng'g, Inc.*, 189 F.3d 1370, 1376 (Fed. Cir. 1999). Objective evidence of nonobviousness can include evidence of the commercial success of an invention, evidence of a long-felt need that was solved by an invention, evidence that others copied an invention, failure of others facing the same state of the art to develop a satisfactory solution, professional approval or skepticism, or evidence that an invention achieved a surprising result. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1569 (Fed. Cir. 1987). Such evidence must have a nexus, or causal relationship, to the claimed invention in order to be relevant to the obviousness or non-obviousness of the claim. *Id.* at 1571.

[CL30] An obviousness evaluation can be based on a combination of multiple prior art references. A patent claim that recites several elements cannot be proven obvious, however, merely by demonstrating that each of its elements was independently known in the art. *SimpleAir, Inc. v. Google Inc.*, No. 2:11-CV-416-JRG, 2014 WL 4950035, at *12 (E.D. Tex. Sept. 30, 2014). Instead, the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art [1] would have had reason to attempt to make the composition or device, or carry out the claimed process, and [2] would have had a reasonable expectation of success in doing so. *Id.* (citing *PharmaStem*, 491 F.3d at 1360). *See also Procter & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009).

[CL31] In addition, “[t]o qualify as prior art for an obviousness analysis, a reference must qualify as ‘analogous art,’ *i.e.*, it must satisfy one of the following conditions: (1) the

reference must be from the same field of endeavor; or (2) the reference must be reasonably pertinent to the particular problem with which the inventor is involved.” *K-Tec, Inc. v. Vita-Mix Corp.*, 696 F.3d 1364, 1375 (Fed. Cir. 2012). The Federal Circuit has explained that “this test begins the inquiry into whether a skilled artisan would have been motivated to combine references by defining the prior art relevant for the obviousness determination, and that it is meant to defend against hindsight.” *In re Kahn*, 441 F.3d 977, 987 (Fed. Cir. 2006). Thus, for example, where a patent-in-suit and the prior art involved memory devices that were used for different purposes, “the jury could reasonably have found that the first criterion of the analogous art test has not been met and that the prior art and the claimed subject matter are not in the same field of endeavor.” *Wang Labs., Inc. v. Toshiba Corp.*, 993 F.2d 858, 864 (Fed. Cir. 1993).

[CL32] The party attempting to meet the burden of demonstrating that a claim would have been obvious in view of combined references must also articulate reasons why a person of ordinary skill in the art at the time of the invention would have combined the references. *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1351 (Fed. Cir. 2014). Vague testimony that is generic and bears no relation to any specific combination of prior art elements is insufficient, because it fails to explain why a person of ordinary skill in the art would have combined elements from specific references in the way the claimed invention does. *Id.*; *see also ActiveVideo*, 694 F.3d at 1327-28 (finding that obviousness testimony was “conclusory and factually unsupported” where the expert “never provided any factual basis for his assertions,” “failed to explain how specific references could be combined, [and] which combination(s) of elements in specific references would yield a predictable result,” rendering the expert’s testimony “essentially a conclusory statement that a person of ordinary skill in the art would have known . . . how to combine any of a number of references to achieve the claimed inventions.”).

[CL33] Thus, obviousness testimony must be factually supported. *Id.* A conclusory statement that a person of ordinary skill in the art would have known how to combine any of a number of references to achieve the claimed invention is not sufficient and is fraught with hindsight bias. *ActiveVideo*, 694 F.3d at 1327-28; *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-19 (2007) (“[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.”).

[CL34] Moreover, the obviousness analysis must be performed without the benefit of hindsight. Thus, it is impermissible to use the patented invention as a blueprint or template to perform a hindsight reconstruction of the invention from prior art elements. *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1320 (Fed. Cir. 2004). Using the invention as a roadmap to re-create the invention from the prior art would improperly discount the value of combining various existing features or principles in a new way to achieve a new result, which is often the very essence or definition of invention. Similarly, the motivation to combine references cannot come from the invention itself. *In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992).

[CL35] Courts have identified various factors or circumstances that weigh against a finding of obviousness. These circumstances include:

- (A) where the prior art itself does not disclose, either expressly or by implication, a reason or motivation to combine elements to arrive at the claimed invention;

- (B) where no foundation or explanation is offered as to why it would have been known to a person of ordinary skill in the art that combined elements would yield a particular result;
- (C) where the art at issue is known or understood to be unpredictable; and
- (D) where one of ordinary skill in the art would have taken the view that a combination of elements would yield an inoperative device, or otherwise would not have had a reasonable expectation of success.

[CL36] A finding of obviousness at the time of the invention requires a plausible rationale as to why modifying one prior art reference in view of another prior art reference would have worked. *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1335 (Fed. Cir. 2013). If the record does not show any reasonable expectation that making a significant change to one reference would have been successful, then the burden of proof with respect to invalidity has not been met. *Id.* It is often necessary to further explain how one of ordinary skill would actually make an alleged combination or modification of prior art references. *See ActiveVideo*, 694 F.3d at 1327 (noting that the “expert failed to explain how specific references could be combined”); *Cheese Sys., Inc. v. Tetra Pak Cheese and Powder Sys., Inc.*, 725 F.3d 1341, 1354 (Fed. Cir. 2013) (affirming summary judgment of nonobviousness where asserted prior art references did not provide adequate explanation or guidance regarding how to make necessary modifications to arrive at claimed invention).

[CL37] Although the background knowledge of a person of ordinary skill is a relevant consideration when conducting an obviousness analysis, there must be a factual basis to support an assertion as to what a person skilled in the art would have known. “In recognizing the role of common knowledge and common sense, [the Federal Circuit] ha[s] emphasized the importance

of a factual foundation to support a party's claim about what one of ordinary skill in the relevant art would have known.” *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362-63 (Fed. Cir. 2013).

Documentary evidence is favored as the most reliable basis for establishing what a person of ordinary skill in the art would have known or would have done. *Id.*

[CL38] Likewise, the fact that the level of skill in the relevant art is high cannot overcome gaps in the factual record regarding missing knowledge in the prior art or a motivation to combine prior art references. “While the skill level is a component of the inquiry for a suggestion to combine, a lofty level of skill alone does not suffice to supply a motivation to combine. Otherwise a high level of ordinary skill in an art field would almost always preclude patentable inventions.” *In re Rouffet*, 149 F.3d 1350, 1359 (Fed. Cir. 1998). “Rarely, however, will the skill in the art component operate to supply missing knowledge or prior art to reach an obviousness judgment,” because “[s]kill in the art does not act as a bridge over gaps in substantive presentation of an obviousness case.” *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999).

[CL39] A challenger faces a particularly high burden of demonstrating that a claim would have been obvious where the prior art references do not disclose all elements of the asserted claims. For example, in *Vizio, Inc. v. ITC*, 605 F.3d 1330, 1342-43 (Fed. Cir. 2010), the Federal Circuit upheld a finding that “none of the prior art references cited by Vizio, alone or in combination, discloses” an element of the asserted claim, and “[t]hus, the Commission correctly concluded that appellants failed to sustain their burden of proving that the asserted claims are invalid.” *See also August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1290 (Fed. Cir. 2011) (“Even if the NSX–80 was on sale, however, it does not disclose the claimed strobing and therefore does not supply the missing element for purposes of the obviousness analysis”);

Honeywell Int’l, Inc. v. U.S., 609 F.3d 1292, 1300-01 (Fed. Cir. 2010) (“Given the failure to prove that the cited references disclose element (a)(3), the government has failed to carry its burden of proving by clear and convincing evidence that the claimed invention would have been obvious to one of skill in the art.”).

[CL40] “A finding that a reference teaches away can preclude a finding that the reference renders a claim obvious.” *In re Chapman*, 595 F.3d 1330, 1337 (Fed. Cir. 2010). “An inference of nonobviousness is especially strong where the prior art’s teachings undermine the very reason being proffered as to why a person of ordinary skill would have combined the known elements.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009). A reference may teach away when a person of ordinary skill is discouraged from following the path set out in the reference. *Id.*

[CL41] Before making a determination of obviousness, the Court must consider objective evidence of obviousness or non-obviousness if present. *See Eurand, Inc. v. Mylan Pharms., Inc.*, 676 F.3d 1063, 1079 (Fed. Cir. 2012) (noting that case law “require[es] that a fact finder consider the objective evidence before reaching an obviousness determination.”); *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1305 (Fed. Cir. 2010) (“To be clear, a district court must always consider any objective evidence of nonobviousness presented in a case.”) Secondary considerations include: a long felt but unresolved need, commercial success, failure of others, copying, unexpected results, and praise by others. *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1379 (Fed. Cir. 2012). Although secondary in time, the secondary considerations are not secondary in importance, and are often the most probative and cogent evidence in the record relevant to the ultimate conclusion of obviousness or nonobviousness. *Truswal Sys. Corp. v. Hydro-Air Eng’g, Inc.*, 813 F.2d 1207,

1212 (Fed. Cir. 1987). There must be a causal nexus between the purported secondary consideration and the claimed invention before such evidence may properly be considered. *See Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1311-12 (Fed. Cir. 2006).

B. Defendants Have Failed to Prove that Any Asserted Claim of the '250 patent is Invalid

[CL42] Defendants have failed to demonstrate by clear and convincing evidence that asserted claims 1, 7, 17, 19, and 21 of the '250 patent would have been obvious to a person of ordinary skill in the art in light of Hitachi, in combination with Sanyo or Glenn, at the time of the claimed inventions. Therefore, the asserted claims are not invalid as obvious in light of Hitachi, in combination with Sanyo or Glenn. *See* **FF111-FF179**.

[CL43] Glenn and Sanyo references are not directed to the same field of endeavor or to the same particular problems that are addressed in the '250 patent. *See* **FF111-FF179**.

[CL44] Glenn and Sanyo teach away from the inventions claimed in the asserted claims of the '250 patent, which are directed to the design and manufacture of light-emitting devices in which only a portion of the resin molding material is disposed over the plating on the top surface of the substrate. *See* **FF111-FF179**. As noted above, “[a]n inference of nonobviousness is especially strong where the prior art’s teachings undermine the very reason being proffered as to why a person of ordinary skill would have combined the known elements.” *DePuy Spine*, 567 F.3d at 1326.

[CL45] None of the prior art references teaches or suggests the combination of elements specified in any of the asserted claims of the '250 patent. *See* **FF111-FF179**.

[CL46] For the reasons discussed above, the Defendants have not met their burden of proof that the asserted claims of the '250 patent are invalid under 35 U.S.C. §103. *See* **FF111-FF179**.

C. Defendants Have Failed to Prove that Any Asserted Claim of the '589 patent is Invalid

[CL47] Defendants have failed to demonstrate by clear and convincing evidence that the asserted claims of the '589 patent would have been obvious to a person of ordinary skill in the art in light of Nakashima and Kim at the time of the claimed inventions. Therefore, the asserted claims are not invalid as obvious in light of Nakashima and Kim. *See* **FF224-FF264**.

[CL48] Neither Nakashima nor Kim includes the combination of elements set forth in the asserted '589 patent claims, including a wall separating the wire and die bonding areas, a through hole or notch under the wall, with the through hole or notch connecting the wall to the bottom portion of the housing. *See* **FF224-FF264**.

[CL49] Defendants did not provide any evidence to suggest a motivation to combine elements of Nakashima and Kim from the references themselves. *See* **FF224-FF264**.

Nakashima and Kim disclose different types of LED devices (top view versus side view), and they address different problems (Nakashima addresses possible delamination between the encapsulant material and the lead electrode, while Kim addresses the flow of resin material into the walls surrounding the recess in the package). Moreover, these problems are themselves different from the problem addressed in the '589 patent (bleeding of the die bonding adhesive).

[CL50] For the foregoing reasons, the Defendants have not met their burden of proof that the asserted claims of the '589 patent are invalid under 35 U.S.C. §103. *See* **FF224-FF264**.

D. Defendants Have Failed to Prove that Any Asserted Claim of the '870 patent is Invalid

[CL51] Defendants have failed to demonstrate by clear and convincing evidence that the asserted claims of the '870 patent would have been obvious to a person of ordinary skill in the art in light of Waitl and Nitta at the time of the claimed inventions. Therefore, the asserted claims are not invalid as obvious in light of Waitl and Nitta. *See* **FF377-FF409**.

[CL52] None of the prior art references teaches or suggests the combination of elements specified in any of the asserted claims of the '870 patent. *See* **FF377-FF409**.

[CL53] Furthermore, the combination of Waitl and Nitta does not disclose the combination of elements as set forth in the asserted '589 patent claims. *See* **FF377-FF409**.

[CL54] For the foregoing reasons, the Defendants have not met their burden of proof that the asserted claims of the '870 patent are invalid under 35 U.S.C. §103. *See* **FF377-FF409**.

III. Nichia is Not Entitled to Injunctive Relief

[CL55] “In accordance with the principles of equity, a plaintiff seeking a permanent injunction ‘must demonstrate: (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.’” *Apple Inc. v. Samsung Elecs. Co., Ltd.*, 735 F.3d 1352, 1359 (Fed. Cir. 2013) (citing *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006)).

[CL56] “The Supreme Court has cautioned that ‘[a]n injunction is a drastic and extraordinary remedy, which should not be granted as a matter of course.’ Rather, ‘[i]f a less drastic remedy ... [is] sufficient to redress [a plaintiff’s] injury, no recourse to the additional and extraordinary relief of an injunction [is] warranted.’” *Id.* (citations omitted).

[CL57] Past harm to a patentee’s market share, revenues, and brand recognition is relevant for determining whether the patentee “has suffered an irreparable injury.” *i4i Ltd. P’ship v. Microsoft Corp.*, 598 F.3d 831, 861 (Fed. Cir. 2010). “Although injunctions are tools for prospective relief designed to alleviate future harm, by its terms the first *eBay* factor looks, in part, at what has already occurred.” *i4i Ltd. P’ship*, 598 F.3d at 862.

[CL58] A patent holder's willingness to license the patents-in-suit is a relevant consideration in determining whether the patent holder will be irreparably harmed in the absence of an injunction. *See Acumed LLC v. Stryker Corp.*, 551 F.3d 1323, 1328 (Fed. Cir. 2008) (explaining that "[w]hile the fact that a patentee has previously chosen to license the patent may indicate that a reasonable royalty does compensate for an infringement, that is but one factor for the district court to consider.").

[CL59] To establish irreparable harm, the patent holder "must show some connection between the patented feature and demand for [the accused] products." *Apple Inc.* 735 F.3d at 1364.

A. Nichia has Failed to Show Irreparable Harm

[CL60] The record shows an absence of meaningful competition. Nichia does not view Everlight as a meaningful competitor in the United States, and Nichia America's internal assessment of sales opportunities in all of North America only identifies Everlight as to three out of 516 sales opportunities for a total sales amount of less than \$50,000. This is the proverbial "drop in the bucket." Everlight had no accused sales to Nichia's top twenty U.S. customers. Further, it was undisputed at trial that at least fifty-percent (50%) of Everlight's accused sales are to distributors. Nichia and Nichia America do not sell to distributors in the U.S. Accordingly, this there is no possible dispute as to competition between the Parties for at least half the overall accused sales. While the absence of actual competition between the Parties related to the accused products conclusively shows that Plaintiff will not be irreparably harmed in the absence of an injunction, a very small area of possible competition (as exists here) shows that any justification for an injunction is remote indeed, and weighs against such grant by the Court. *See FF411–FF451.*

[CL61] Plaintiff has failed to establish past irreparable harm, or the likelihood of irreparable harm in the future based on lost sales. As set forth above, Plaintiff's accusations of infringement cover a seven-year period, yet Plaintiff failed to establish that Defendants were responsible for causing a single lost sale in the U.S. Moreover, Plaintiff admitted that it made no attempt to establish the relevant market share for Nichia Corporation or Nichia America and did not attempt to determine if either company lost market share to Defendants. In the one claimed instance of a lost sale to Lights of America, involving \$17,000 in accused LED products, the evidence showed there were several other formidable, lower-priced, and licensed competitors for the same opportunity. Plaintiff's damages expert admitted he made no attempt to establish "but for" causation that Nichia America would have made the sale to Lights of America in the absence of Everlight's claimed infringement. Consequently, Plaintiff cannot establish irreparable harm for even this single instance of a claimed lost sale because Plaintiff failed to present any evidence to establish that Nichia America would have made the sale to Lights of America in the absence of competition from Defendants, and Plaintiff's damages expert admitted he made no effort to determine or establish such. *See, e.g., Grain Processing Corp. v. Am. Maize-Prod. Co.*, 185 F.3d 1341, 1349 (Fed. Cir. 1999) (to establish harm from alleged lost sales "the patent owner has an initial burden to show a reasonable probability that he would have made the asserted sales 'but for' the infringement. Once the patent owner establishes a reasonable probability of 'but for' causation, the burden then shifts to the accused infringer to show that the patent owner's 'but for' causation claim is unreasonable.") (internal citation and brackets omitted). *See* **FF411–FF451**.

[CL62] Similarly, Plaintiff has failed to establish past irreparable harm or the likelihood of irreparable harm in the future based on price erosion. Plaintiff's one claimed

instance of price erosion involving GE cannot be attributed to competition from Everlight. First, there were several licensed and lower priced competitors in addition to Everlight pursuing the GE opportunity which drove down prices. Second, the undisputed evidence at trial was that GE required close to \$0.09 per LED, and therefore, Nichia was going to have to lower its prices, regardless of Everlight's competition. Third, Nichia admitted it was already selling the same 757 LED to GE's competitors, such as TCP, for \$0.09 or less in the same period. Fourth, Nichia admitted at trial that it was impossible to maintain different prices between GE and TCP because of the geographic proximity of the two companies' facilities and overlap in their workforce. Therefore, even if Nichia thought it could charge GE a higher price for the 757 LED, once Nichia dropped its prices with TCP, Nichia could no longer maintain a price disparity. Finally, Nichia's economist, Dr. Lynde, admitted there was not sufficient evidence to establish price erosion, and he did not attempt such an analysis. In light of the foregoing, Plaintiff cannot establish that Everlight was the "but for" cause of its claimed price erosion. *See* **FF411–FF451**.

[CL63] Plaintiff's licensing of the patents-in-suit to the suppliers of 41% of the global LED market also precludes a finding of irreparable harm. Several of these licensees are significant competitors and considered "major threats" to Nichia's flagship 757 LED product. Plaintiff claims it has been selective in licensing the patents-in-suit, yet the mere existence of such licenses indicates that the harm for any infringement of the patents-in-suit is not irreparable, but rather can be addressed through other compensatory means. *See* **FF411–FF451**.

[CL64] Moreover, because Nichia Corporation has licensed the patents-in-suit to many competitors and because there are multiple low-priced non-infringing alternatives from competitors available to replace the accused Everlight products if such products were not available, Nichia America has failed to establish the amount of any additional supposed sales, if

any, in the absence of competition from Everlight. Nichia has failed to establish it will suffer irreparable harm in the absence of an injunction. *See* **FF411–FF451**.

B. Monetary Damages Are Adequate


[CL65] Plaintiff's damages expert did not attempt to calculate a reasonable royalty or lost profits, and therefore Plaintiff's contention that a reasonable royalty and/or lost profits are too uncertain to calculate is unavailing.

[CL66] Plaintiff failed to present evidence that it suffered from lost sales and/or price erosion due to Everlight's infringement. *See* **FF411–FF451**. Furthermore, even if Plaintiff had presented evidence sufficient to such harm, any such harm can be readily remedied through monetary compensation rather than a permanent injunction.

[CL67] Further, Plaintiff has failed to present any evidence suggesting a reasonable royalty and/or lost profits would not be adequate to compensate Plaintiff for the harm caused by Defendants' limited U.S. competition. *See* **FF411–FF451**. Plaintiff has already licensed several large competitors in the U.S. Plaintiff claims it has been selective in the consideration it receives for licensing the patents-in-suit, but the existence of the licenses indicates that monetary compensation can address the harm for any infringement of the patents-in-suit. *See* **FF411–FF451**.

[CL68] Because Plaintiff has failed to show irreparable harm and because monetary damages are adequate to compensate for the harm of Everlight's infringement of the patents-in-suit, Plaintiff has failed to show that it is entitled to the extraordinary remedy of a permanent injunction.

So ORDERED and SIGNED this 25th day of January, 2016.



RODNEY GILSTRAP
UNITED STATES DISTRICT JUDGE